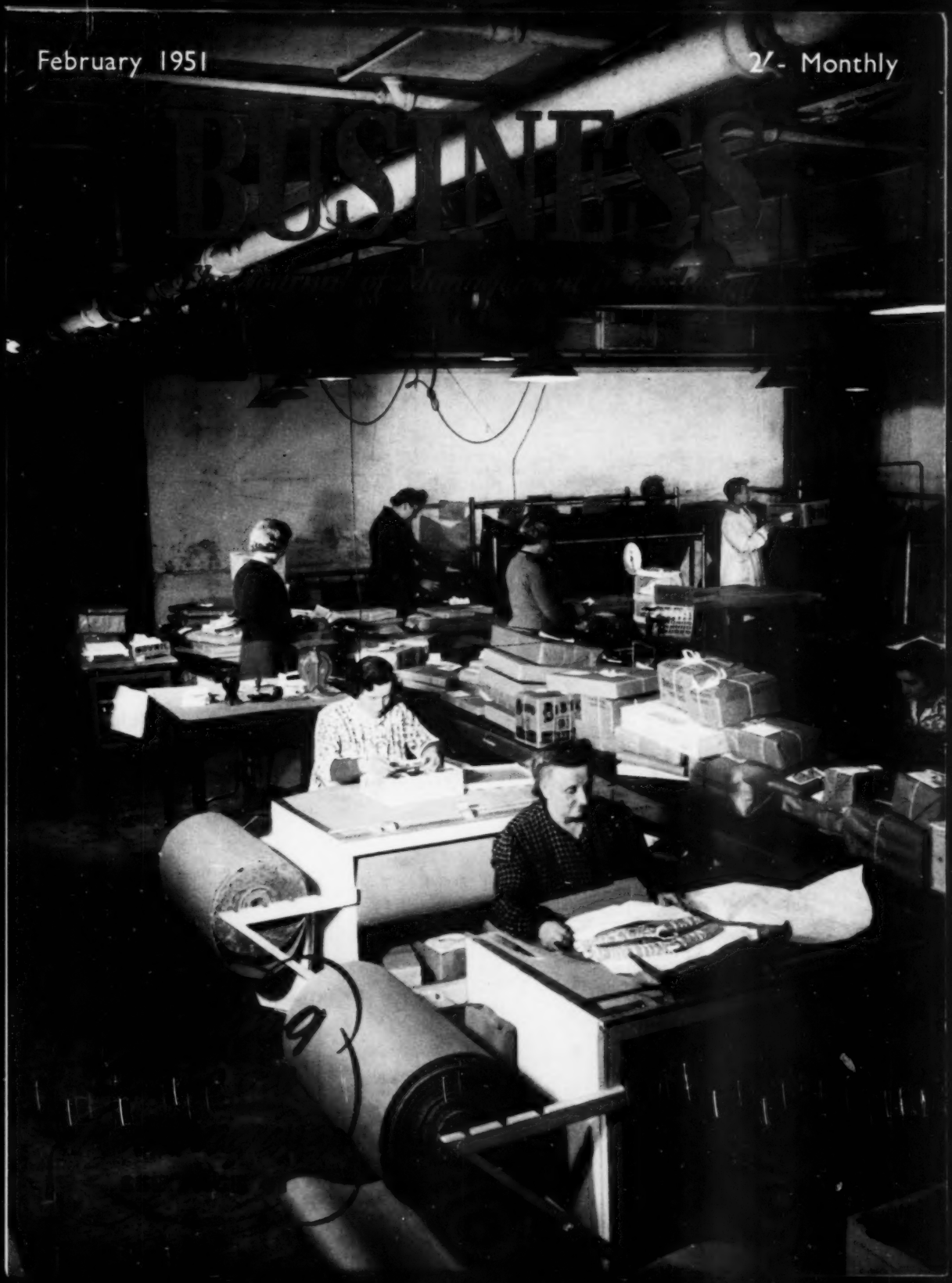
February 1951

2/- Monthly

BUSINESS



PROGRESS through EFFICIENCY

Whatever your business, the adoption of Remington Rand work-simplifying systems and equipment will ensure greater efficiency and better management control.

Our long experience of the filing and record-keeping problems of all trades and professions is at your disposal. Entirely without obligation, one of our expert Technical Representatives will be pleased to analyse *your* problem and submit proposals for instituting a scheme or installation exactly suited to your needs. Write immediately for further details and descriptive literature.

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Kardex Visible Records. Graphic Control Systems. Filing Systems. Indexing Equipment. Systems Supplies and Record Forms. Certified Safe Equipment. Office Furniture, etc.

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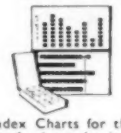
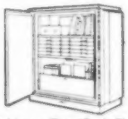
Modern Filing Systems for every individual need.



Graphdex Charts for the visual portrayal of production, sales, and statistical data.



Safe-Cabinet Certified Fire Protection for vital business records.

REMINGTON RAND LTD. (Dept. G.14), 1 NEW OXFORD ST., LONDON, W.C.1. Tel. CHAncery 8883

THE SECRETARY YOU NEVER HAVE TO RING FOR . . .

TIME-MASTER—the electronic dictating machine

THE SCIENCE of electronics is revolutionising many of our concepts. And your ideas about the time and place for dictation will be revolutionised by the Dictaphone Time-Master — the new, *electronic* dictating machine.

First, the Time-Master is so compact, streamlined and light-weight (only 4¼ inches high) that you can take it anywhere and everywhere: and dictate to it whenever you wish.

Then, its recording medium is the unique new plastic Memobelt. Each Memobelt takes 15 full minutes dictation. Each is so flexible that it folds flat for filing. So inexpensive it can be thrown away after being used once. So light that up to ten can be posted in an ordinary envelope for 2½d.

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Rapid transcribing. Your secretary has complete control of volume, tone, speed, the whole time she is typing: a pedal to back-space or repeat as often as she may wish — all instantaneous and uniform in action.

Write for TIME-MASTER literature to Dictaphone Co. Ltd. (Dept. Q), 107 Kingsway, London, W.C.2.

DICTAPHONE ELECTRONIC DICTATING MACHINES

Regd. Trade Mark

MADE IN GREAT BRITAIN. BRANCH OFFICES: LEEDS NEWCASTLE BIRMINGHAM MANCHESTER LIVERPOOL BRISTOL GLASGOW DUBLIN CORK BELFAST

How much longer for those work benches?

Storage-No! Standard racks won't do!

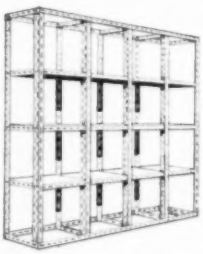
Those tables-ordered a month ago!

Partitions-No, we haven't the timber!

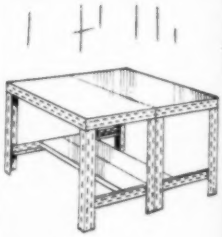
That machine guard-it doesn't fit!

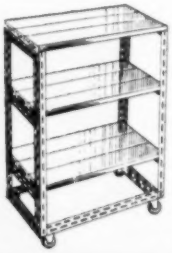
why worry? use DEXION SLOTTED ANGLE

It's an inspiration—this Dexion idea for making your own equipment! Cuts out delays. Cuts costs to a fraction. No need for any particular skill. No need for any but the simplest tools.



With a small stock of Dexion you can solve all kinds of equipment problems — on the spot — simply by cutting Dexion Angle to lengths required and bolting them together through the slots.





DEXION ANGLE

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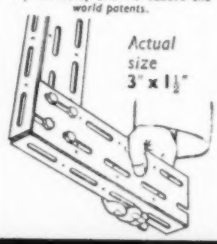

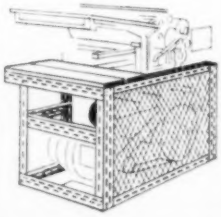

Write or 'phone for Illustrated Folder A2. Better still, come and see an actual installation (no appointment needed) at:—34 Fouberts Place, W.1. (Near Liberty's)

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LONDON, W.1

Telephone: REGent 4841-5
Telegrams: Dexion, Piccy, London

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To quote but one example :—

Following our investigations, and using Form System of our Design, one firm achieved the following savings (Certified by their independent Time and Motion Study Test) :—

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Labour Cost Saving	..	£55 per week
Labour Cost Saving	..	£2,750 per annum

Stationery Saving:

Previous Stationery Cost	..	£25,204 8 0
Fanfold Stationery Cost	..	£14,901 5 0
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FANFOLD CONTINUOUS FORMS.

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ONE-TIME CARBON UNIT SETS for tabulating and addressing machine use.

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FANFOLD BILLING UNITS.

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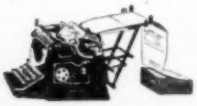
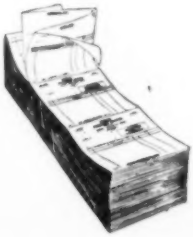
and at BIRMINGHAM, CARDIFF MANCHESTER, SHEFFIELD, GLASGOW
PLANNERS OF SYSTEMS FOR ECONOMY OF TIME, LABOUR AND MATERIALS IN THE OFFICE

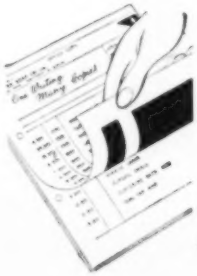
FANFOLD for FORMS

FANFOLD for FORMS

Right and below : Continuous Forms for Continuous Typing and Business Machine Records







Above : Autographic Registers and Register Forms

Left : Single Sets of Spot-Carboned Forms

every factory has many uses for paint brushes

From legitimate uses like cleaning metal filings out of machines or components to . . . dusting the Managing Director's bowler. And there's a *Harris brush to suit every use, a Harris brush that will do the best job by far because (1) the bristles won't come out except under extreme provocation (2) the brushes last longer and (3) they can be replaced by *precisely* the same quality. That consistency in Harris standards saves the devil of a lot of selecting and testing.

And there's the saving in cost. Yes, quite considerable. Ask your local Harris stockist for details and samples—or write direct to us L. G. Harris & Co. Ltd., Stoke Prior, Worcs.

and there's a *Harris* brush for every one

There are 5 grades of brushes in the Harris range

CRC 103

For comfort and efficiency . . . .

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There is a suitable Tan-Sad Chair for everyone in your firm, from director to typist, offering maximum comfort and encouraging a correct sitting position. Everyone does better work in a Tan-Sad.

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Pressure proofed by patented process and tested at every stage. Only proven leads go into Venus Drawing Pencils

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A patented colloidal process removes all grit and impurities—they must be smooth

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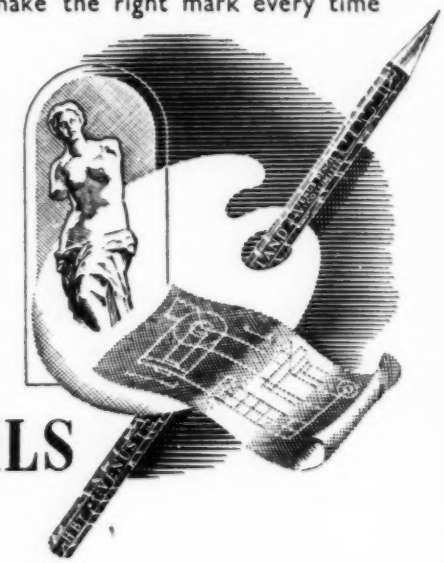

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She has her work cut out . . .

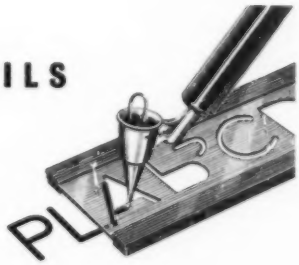
Lucky girl! Her job is lettering, and with UNO-stencils her work is *cut out for her*. She simply fills in the blanks, and produces crisp clean lettering at great speed.

UNO pen stencils, made from transparent plastic, give a professional touch to your lettering first time and every time. Using UNO waterproof inks, you can produce perfect and permanent results on maps, plans, drawings, showcards, price tickets and signs, etc., etc. There are many styles of lettering available, and special stencils and corner plates can be made to order.

Complete sets from 17/6, obtainable from most good Stationers, or direct.

uno PEN STENCILS

cut out for the job



Write for illustrated leaflet to,

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TAYLORS *for all makes of* TYPEWRITERS

★ **Adding Machines, Duplicators, Cash Registers, Calculators, Time Recorders, and All Business Appliances BOUGHT, EXCHANGED, HIRED AND REPAIRED**

Save Time—HIRE an Adder for Stocktaking

ADDOGRAPH the simplest Portable, adding, and listing machine — delightful to use. 8 col. to add from ¼d. to £9,999 19s. 11¾d. 9 col. to add from ¼d. to £99,999 19s. 11¾d. Hand and electric models with or without subtraction and wide paper carriages. No modern office can afford to be without one.

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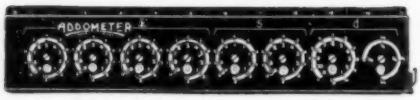

Rapid Automatic Addition and Subtraction. Rests flat on the books. For Decimal or Ordinary Figures and Feet and Inches etc. FOR POCKET OR DESK. So simple anyone can use it. In Plush-lined ducoid case Size, 11¼" × 2¼" × ⅝".

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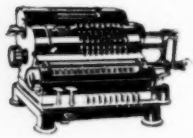

ROTARY CALCULATORS ALL MAKES For all calculations. Multiply, divide, add and subtract in 1/10th time taken to do so mentally.

★ **WANTED URGENTLY**

HIGHEST PRICES PAID for all Makes of Modern Office Machinery: Adders, Calculators, Cashiers, Addressers, Duplicators, Typewriters, Steel Safes, and Steel or Wood Office Furniture

★ **IN STOCK**

A few Visible Index Systems for sale. Safes, Desks, Chairs and Tables

ELIMINATE LOSS AND FRAUD BY USING A "SAFEGUARD," THE BEST CHEQUE PROTECTOR. Used by leading banks and firms. Do you realise that an altered cheque is your own liability? Price £10 10s. All makes of Cheque Writers at bargain Prices.

TAYLORS TYPEWRITER MARKET

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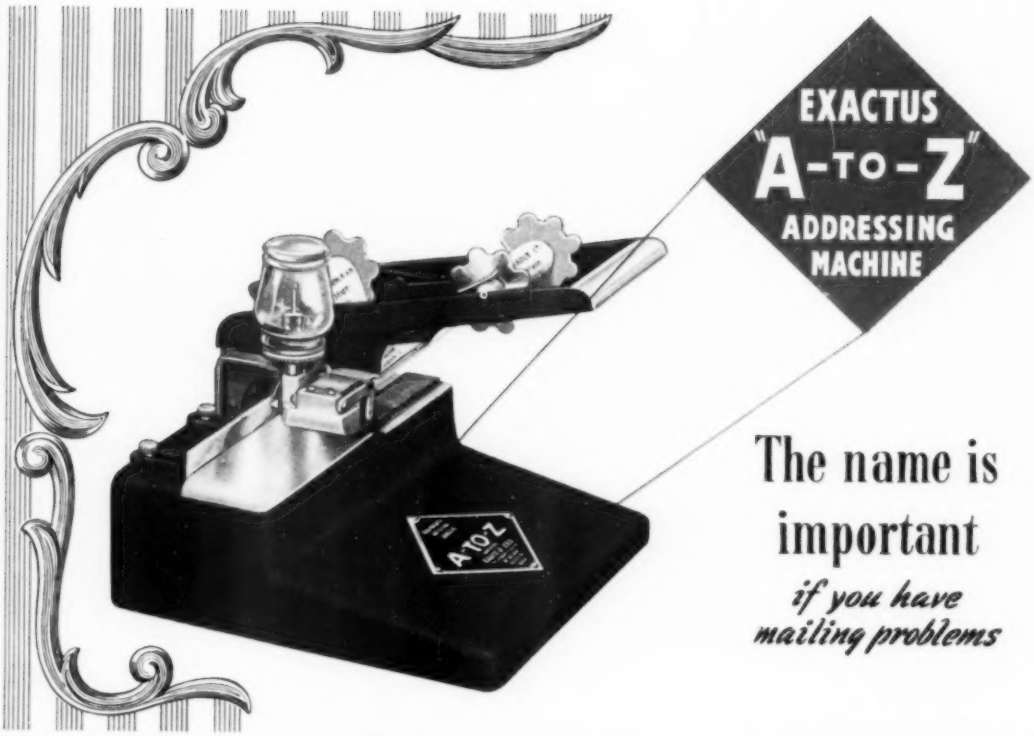
74 CHANCERY LANE (Holborn End) LONDON W.C.2 *and at Maidenhead*



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WORLD'S LOWEST PRICED ADDRESSER!

The "A-TO-Z" is a speedy machine for addressing envelopes, circulars, statements, postcards, etc.

NO INK – NO PADS – NO STENCILS

Automatic envelope ejector

PRICE:
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Complete ready for use.

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ONE CLEANER does the work of 7

IF seven cleaners all in a row, armed with buckets and brooms, scrubbing brushes and mops, worked their way across a large floor area, they might possibly clean it in the same time as would **ONE** unskilled operator using a power-driven Dixon machine.

They **MIGHT** do it as quickly but they certainly couldn't do it half so well.

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Most Dixon users find that a Machine pays for itself within the first two years. For ever afterwards it goes on saving money at the rate of hundreds of pounds annually, and of course it solves the labour problem as well.

Write for descriptive literature or request a demonstration on your premises.

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Multiple Organisations should ask for details of Dixon's unique **Group Floor Maintenance Scheme** — planned to cut cleaning costs still further.

For Floor Maintenance in Offices, Shops, Homes, etc., specify Columbus—the Mechanical Charwoman.

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SCRUBS, WAXES, POLISHES, BURNISHES ALL TYPES OF FLOORS

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the WHOLE organisation on your desk . . . . .

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Agents and Service Branches throughout the Country.

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"I want a new typewriter!"

"We want new Royals !"

WHY THE PREFERENCE FOR ROYAL IS BETTER THAN 2 TO 1!

Surveys show that girls who type prefer Royals 2½ to 1 over any other make of standard office typewriter.

Even more—**the preference for Royal equals the vote for the next three most popular standard office typewriters combined!**

Royals have time-saving, work-saving features not found on any other make. They are more durable, sturdier, and more dependable.

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"THE MACHINE TO COUNT ON"

For Immediate Delivery!

● The "Original-Odhner" calculators are easy to handle, need no trained operator, and yet are so efficient and inexpensive that if one is used by a junior clerk for ten minutes a day it will pay for itself within a year. Devices that would increase the cost and complicate the construction have been eliminated; the "Original-Odhner" is streamlined down to main essentials.

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From £35 nett

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SELDEX (DEPT. B.) CONSTRUCTORS LTD.,
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Please send me details of Seldex Systems particularly relating to .....Departments and a free copy of "Seldex, how it works."

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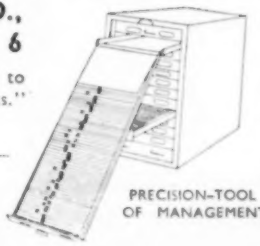

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VISIBLE RECORDING SYSTEMS

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The EMPIRE Aristocrat Portable Typewriter proclaimed to be ten years ahead of its time in design, is the first typewriter in the world to offer such compactness, such simplicity of operation, such beauty in appearance. It weighs only 8¾ lbs. complete in its case and stands no higher than an ordinary box of matches.

Over 500,000 people, attracted by this modern conception of typewriter construction, are already enjoying the advantages of this unique personal writing machine.

. . . You too should use an **EMPIRE** *Aristocrat*

PORTABLE TYPEWRITER

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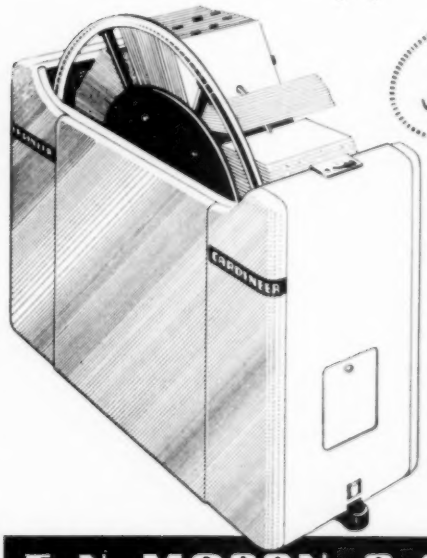

The **Cardineer**

ROTARY CARD INDEX

. . . is the fastest fact-finding and recording system in the world. The beautifully designed metal cabinet is compact and mobile on four smooth running castors. Record cards are positioned on a central drum rotated by a handwheel, the essence of simplicity for easy, one-handed operation at NATURAL DESK HEIGHT. Cards move instantly into direct vision with the minimum of effort on the part of the operator, thus eliminating undue physical exertion and eyestrain. The sizes of cards used are up to 8½" wide by 5½" deep and are printed to meet the given requirements of any organisation. Many kinds of "finder" cards and "flasher" signals are available to provide for sectional indexing and split-second finding. Every record card has THREE VISIBLE EDGES—a great asset for instant sighting. Seven segments on the central drum contain the record cards. These segments may be removed as required for easy division of work at peak periods. Cards may be individually removed and replaced with simple, one-handed motion. Please send for complete details and illustrated brochure of this streamlined and efficient system to the BUSINESS EQUIPMENT DIVISION (B)

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THE BUSINESS EQUIPMENT DIVISION

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And at LONDON, GLASGOW, MANCHESTER and BRISTOL.

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OR ANY BUSINESS

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Forward
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E.N.M. Type-High Numbering Boxes are constructed from hardened tool steels to ensure maximum durability, and incorporate many exclusive features.

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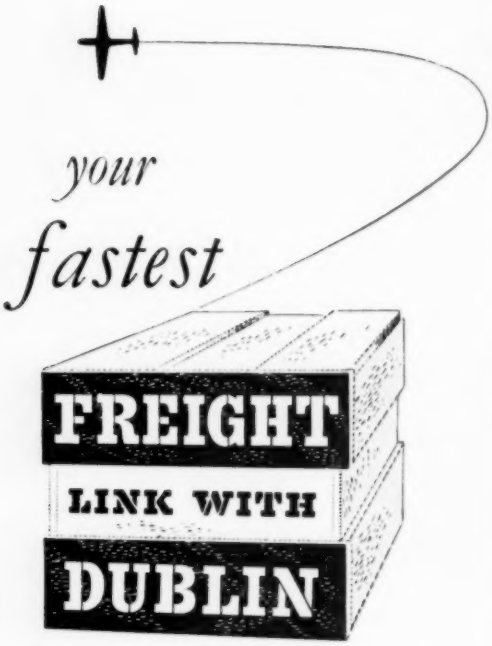

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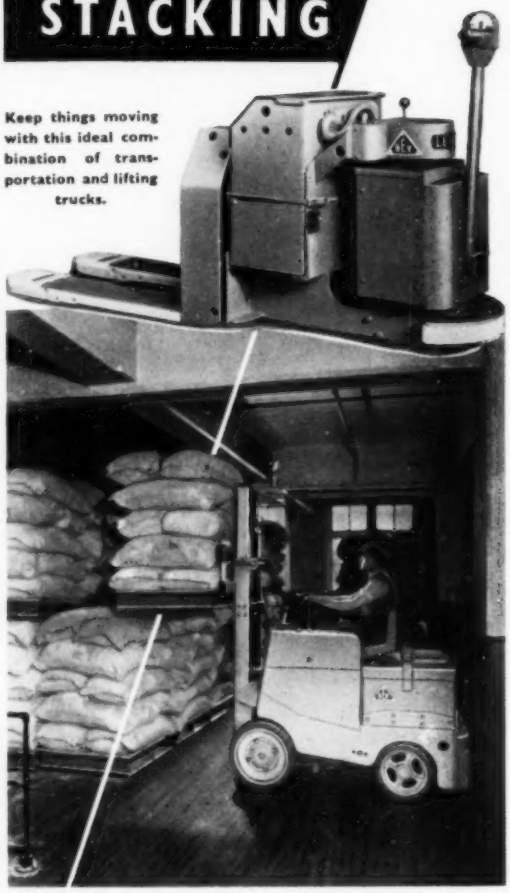

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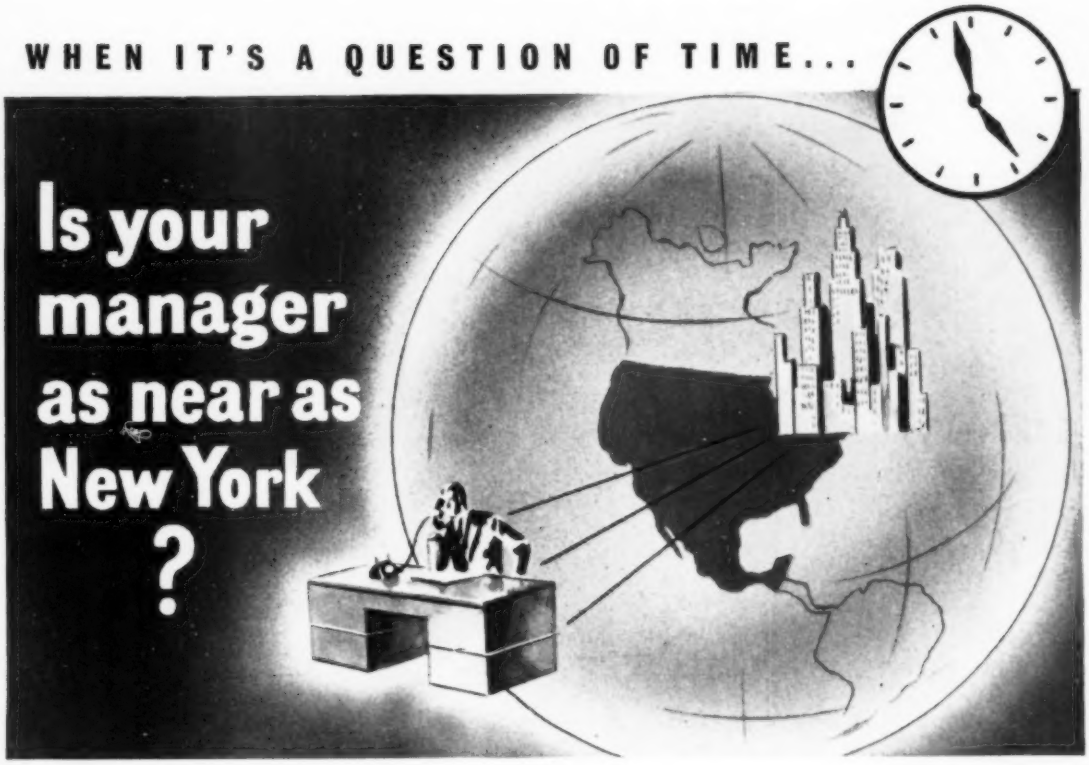

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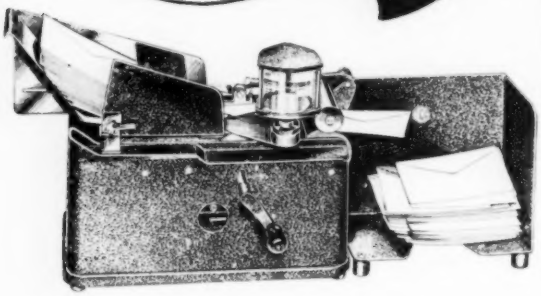

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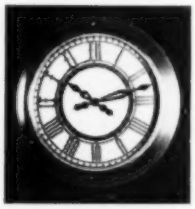

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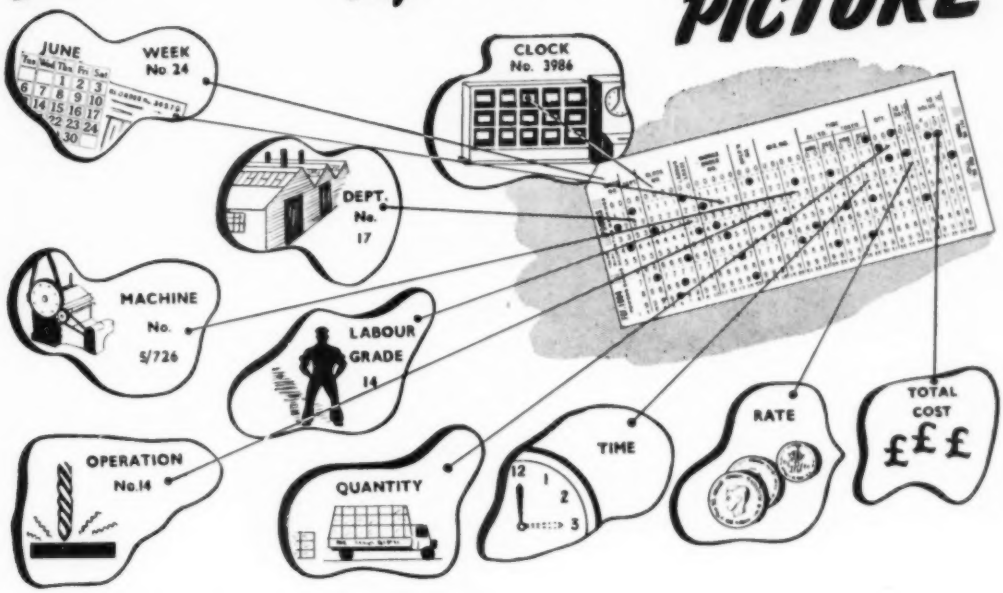

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ACCOUNT BOOKS
Copeland-Chatterson Co. 19
Jones, Percy (Twinlock) 91
ACCOUNTING MACHINES
Burroughs Adding Machine Ltd. 32
National Cash Register 40
Powers-Samas Ltd. ... 27
Remington-Rand Ltd. Cover ii
Underwood Elliott Fisher 38
ACCOUNTING SYSTEMS
Art Metal Construction 30
Copeland-Chatterson Co. 19
Definac Ltd. 79
Shannon Ltd. 83
ADDING MACHINES
Block & Anderson Ltd. ...
Bulmer's (Calculators) Ltd. (Addo) 67
Burroughs Adding Machine Ltd. 32
National Cash Register 40
Office Machinery Ltd. ... 85
Sumlock Ltd. 87
ADDRESSING MACHINES
Addressall Machine Co. 103
Adrema Ltd. 93
Exactus Ltd. 9
The Hayward Co. Ltd. ...
ADDRESSING MACHINE ATTACHMENT
Fanfold Ltd. ... ...
Smith, W. H. & Son Ltd. ...
AIR TRANSPORT
Aer Lingus 18
B.O.A.C. ... ...
Pan American Airways ...
ASSURANCE
General Accident, Fire & Life Corp. Ltd. ... ...
BANKS
Midland Bank Ltd. ... 22
BLINDS
Avery, J. & Co. ... ...
BOOKS & PUBLICATIONS
McGraw Hill Co. Ltd. ... ...
Pitman, Sir Isaac & Sons ...
Psychology Publishing ...
Thomas, A. & Co. ... 80
BROADCAST MUSIC
Central Rediffusion Services Ltd. ... ...
Telephone Rentals Ltd. 25
BRUSHES
Harris, L. G. & Co. Ltd. 4
BUSINESS EQUIPMENT AND ACCESSORIES
Blick Office Equipment ...
Block & Anderson Ltd. 13
Coombs, H. A. Ltd. ... 104
Copeland-Chatterson Co. 19
Shannon Ltd. 83
Steeletta Box File Co. 91
CALCULATING MACHINES
Block & Anderson Ltd. ...
Bulmer's (Calculators) 67
Burroughs Adding Machine Ltd. 32
Sumlock Ltd. 87
Wood, Gilbert Ltd. ... 14
CANTEEN EQUIPMENT
Bartlett, G. F. E. Ltd. ...
Catering & Industrial Furniture Ltd.... ... 103
Dawson Bros. Ltd. ... 100
Farquharson J. & Sons 103
Hodgkison & Co. ... ...
Lockhart Equipment Ltd. ...
CARD & INDEX SYSTEMS
(See Filing Systems)
CASTINGS
Renfrew Foundries Ltd. 34
Star Foundry Co. Ltd. ...
COIN COUNTING MACHINES
International Coin Counting Machine Co. 26
COLLEGES AND COURSES
Linguaphone Institute ...
Speaker's Club ... ...
CONTINUOUS STATIONERY
Carter-Davis Ltd. ... 23
Copeland-Chatterson Co. 19
Dickinson, John & Co ... ...
Egry Ltd. 28
Fanfold Ltd. 3
Lamson Paragon Co. ... ...
Smith W. H. & Son Ltd. ...
CYCLE PARKS
Abix (Metal Industries) Ltd. 31
Constructors Ltd. ... ...
DICTATING AND RECORDING EQUIPMENT
Dictaphone Co. Ltd. ... 1
E.M.I. Ltd. ... ...
Ediphone Voice Writing
Haycraft, M. & L. Ltd. 104
Letterphone Co. ... ...
London Office Mch. Ltd. 24
Thermionic Products ... ...
Trevor Johnstone Co. ... 70
Wirek (Electronics) Ltd. 84
DRAWING OFFICE EQUIPMENT
West, A. & Partners ... 7
DUPLICATING MACHINES
Block & Anderson Ltd. 13
Bulmer's (Calculators)... 67
Ellams Duplicator Co.... 86
Fermaprint Ltd.... ... 22
Gestetner, D. Ltd. ... ...
Kaye's Rotaprint Ltd. ... ...
Office Machinery Ltd. ... ...
Roneo Ltd. ... ...
ELECTRIC CLOCKS
Gent & Co. Ltd. ... 26
International Time Recording Co. Ltd. ... 71
Magneta Time Co. Ltd. 24
Smith's English Clocks ...
Synchronome Co. Ltd.... ...
Telephone Rentals Ltd. 25
ELECTRICAL PLANT
Crompton-Parkinson ... ...
ENGRAVERS AND BLOCKMAKERS
Gee & Watson Ltd. ... ...
FACTORY EQUIPMENT AND ACCESSORIES
Constructors Ltd. ... ...
Sieber, James Equipment 98
FILING SYSTEMS
Amselock Ltd. 82
Art Metal Construction 30
Copeland-Chatterson Co. 19
Expandex Visible Filing ...
Percy Jones Ltd. ... 91
Kalamazoo Ltd. 21
Remington-Rand Ltd. Cover ii
Shannon Ltd. 83
Steeletta Box File Co. 91
FILM PROJECTORS
Wallace Heaton Ltd. ... ...
FIRE PREVENTION
Nu-Swift Ltd. ... ...
FLOORING
Gt. Met. Flooring Co.... 80
Perring, John Ltd. ... ...
HEALTH SERVICES
Cottrell & Co. ... ...
Cresco Ltd. ... ...
Cuxson Gerrard & Co.... 97
Freeder Brothers ... 99
Harcraft Ltd. 94
Hunt & Colleys Ltd. ... 97
Hygiene Products Ltd.... 36
Peter's Automatic Machines Ltd ... 97
Saniguard Appliances ... 94
HEATING
Spiral Tube Ltd.... ... 73
INDUSTRIAL CLEANING
B.V.C. & Eng. Co. Ltd. ...
Dixon, R. G. & Co. Ltd. 10
Lamson Eng. Co. Ltd. ... 75
Morphy Richards Ltd.... 89
LETTER OPENING MACHINES
International Coin Counting Machine Co. 26
LIGHTING
Crompton-Parkinson ... ...
G.E.C. Ltd. ... ...
Hadrill & Horstmann ... 93
Met.-Vick Electrical Co. ...
Mountsun Ltd. 71
Siemens Electric Lamps
LOOSE LEAF LEDGERS AND SYSTEMS
Art Metal Construction 30
Copeland-Chatterson Co. 19
Jones, Percy (Twinlock) 91
Kalamazoo Ltd.... ... 21
Ruddock, J. W. & Son ...
MECHANICAL HANDLING
Lamson Eng. Co. Ltd.... 75
Wingrove & Rogers Ltd. 18
MICROFILM CAMERAS
Edison Swan Electric Co.
Kodak Ltd. 72
NOISE PREVENTION
Burgess Products Co. ... 80
NUMBERING MACHINES
English Numbering Machines Ltd.... ... 17
OFFICE FURNITURE (STEEL)
Amselock Ltd. 82
Art Metal Construction 30
Aston Cabinet Co. Ltd. ...
Cave, C. W. & Co. Ltd. 87
Constructors Ltd. ... ...
Dare-Inglis Products Ltd. 74
Evertaut Ltd. ... ...
Milner's Safe Co. Ltd.... ...
Office Machinery Ltd. ... ...
Perring, John Ltd. ... ...
Roneo Ltd. ... ...
Rubery Owen Co. Ltd. ... ...
Tan-Sad Chair Co. Ltd. 3
Valor Co. Ltd. ... ...
OFFICE FURNITURE (WOOD)
Abbott Bros. (Southall) ...
Aston Cabinet Co. Ltd. ...
Cave, C. W. & Co. Ltd. ...
Grover, F. & Son ... ...
Mason, E. N. & Sons ... ...
Oetzmann & Co. Ltd. ... ...
Office Machinery Ltd. ... ...
Perring, John Ltd. ... ...
Simpoles Ltd. ... ...
OVERALLS
Wheeler, H. & Co. Ltd. 73
PACKING SUPPLIES
Britannia Folding Box ...
Gosheron, John & Co.... 20
Johns, Son & Watts ... 99
Universal Pulp Containers Cover iv
PAINTS
British Paints Ltd. ... ...
PAPER MERCHANTS
Bowater Paper Corp. ...
PENS AND PENCILS
Venus Pencil Co. Ltd. ... 6
Waterman Pen Co. Ltd. ...
PHOTOGRAPHIC REPRODUCING EQUIPMENT
Edison Swan Electric Co.
Kodak Ltd. 72
Photostat Ltd. ... ...
Ruthurstat Ltd. 81
West, A. & Partners Ltd. 78
POSTAL FRANKING MACHINES
Roneo-Neopost Ltd. ... 68
Universal Postal Frankers ...
PRESSINGS
Johnson, Thos. Ltd. ... 91
PRINTING MACHINES
Kaye's Rotaprint Ltd. ... ...
RIBBONS & CARBON
Columbia Ribbon Mfg.... ...
Kolok Mfg. Co. ... ...
Richardson, W. J. & Sons 14
ROTARY REPRODUCER
Kaye's Rotaprint Ltd. ... ...
SAFES
Chatwood Safe & Eng. Co....
Milner's Safe Co. Ltd. ... ...
Remington Rand Ltd. Cover ii
SEATING
Dare-Inglis Products Ltd. 74
Evertaut Ltd. ... ...
E.C.S. Industrial & Office Supplies ... ...
Leabank Chairs Ltd. ... 89
Office Machinery Ltd. ... ...
Pel Ltd. ... ...
T.A. Products Ltd. ... 99
Tan-Sad Chair Co. Ltd. 5
STEEL STORAGE EQUIPMENT
Brown, F. C. 31
Constructors Ltd. ... ...
Copeland-Chatterson Co. 19
Dexion Ltd. 2
Harvey, G. A. & Co. Ltd. 73
Milner's Safe Co. Ltd.... ...
Randalrak Ltd. ... ...
Westwood, Jos. & Co.... 92
TABULATING MACHINES
Powers-Samas Ltd. ... 27
TARPAULINS
Lomas, S. & Co. Ltd. ... 104
Piggott Bros. 92
TELEPHONE AMPLIFIERS
Fonadek (Branson) Ltd.
Televox Ltd. 90
TELEPHONES AND SOUND EQUIPMENT
Central Rediffusion Services Ltd. ... ...
Communication Systems ...
Dictograph Telephones Ltd. 20, 83
General Signal & Time Systems Ltd. ... ...
Hadley Sound Equips. ... 12
Magneta Time Co. Ltd. 24
Pye Telecommunications 69
Telephone Rentals Ltd. 25
TEMPERATURE CONTROL
Smith's English Clocks ...
TICKET PRINTING MACHINES
Dapag (1943) Ltd. ... 85
TILING
Woolliscroft, Geo. & Son ...
TIME RECORDERS
Blick Time Recorders 11, 75
General Signal and Time Systems Ltd. ... ...
Gent & Co. Ltd. 26
Gledhill-Brook Ltd. ... 93
International Time Recording Co. Ltd. ... 71
Magneta Time Co. Ltd. 24
Servis Recorders Ltd. ... ...
Synchronome Co. Ltd. ... ...
Telephones Rentals Ltd. 25
TIME SWITCHES
Venner Time Switches ...
TRANSFER (PAINT)
Trapinex Ltd. Cover iii
TYPEWRITERS AND ACCESSORIES
Barlock (1925) Co. ... ...
British Typewriters Ltd. 16
Halda Typewriter ... ...
Imperial Typewriter Co. 29
International Time Recording Co. Ltd. ... 71
Remington-Rand Ltd. Cover ii
Royal Typewriters ... 12
Taylor's Typewriter ... 8
T.S. (Office Equipment) ...
Victrolec Ltd. ... ...
Underwood Elliott Fisher 38
VENTILATING EQUIPMENT
Colt Ventilation Ltd. ... ...
VISIBLE RECORDS
Art Metal Construction 30
Bulmer's (Calculators)... 67
Cave, C. W. & Co. ... 87
Copeland-Chatterson Co. 19
Expandex Visible Filing Co. Ltd. ... ...
Kalamazoo Ltd. 21
Mason, E. N. & Sons ... 16
Office Machinery Ltd. ... ...
Remington-Rand Ltd. Cover ii
Roneo Ltd. ... ...
Seldex Ltd. 15
Shannon Ltd. 83
Valor Co. Ltd. ... ...
WATCHMAN'S CLOCKS
Blick Time Recorders ... 75
Racecourse Equipment ... 81

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BUSINESS

The Journal of Management in Industry

CONTENTS FOR FEBRUARY, 1951

BUSINESS NEWS — Page

SALIENT FIGURES OF THE MONTH ... 35
TRENDS IN COAL ... 37
LOOK-OUT FOR WHAT'S NEW ... 48

POLICY AND MANAGEMENT

HOW TO CUT PACKAGING COSTS — *BUSINESS EDITORIAL STAFF* 41
EFFICIENT WORK FLOW AIDS PRODUCTION — *A. G. THOMSON* 49
G. N. BRIDGES: BIOGRAPHY — *PHILIP F. DYER* 53
USING V.H.F. RADIO IN BUSINESS — *BRIAN CUMMINGS* 56
MEN OF VISION ... 59

ADMINISTRATION AND OFFICE PRACTICE

PUNCHED CARDS—INSURANCE CONTRIBUTIONS — *J. COAST* 61
COSTING HELPS A PROCESS INDUSTRY — *J. MANOLESCUE* 64
NEW FOR YOUR OFFICE ... 66
OFFICE EQUIPMENT INDUSTRY NEWS ... 72

INDUSTRIAL MANAGEMENT AND EQUIPMENT

PLANNED TEAMWORK SPEEDS OUTPUT — *A. G. THOMSON* 76
INDUSTRIAL EQUIPMENT SURVEY ... 78

HEALTH — WELFARE — CANTEEN

TEXTILE MILL'S WELFARE SCHEME — *JULIAN ACOMB* 95
CONVEYOR CAFETERIA — *MALCOLM MOORE* 101

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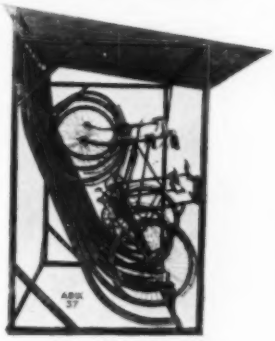

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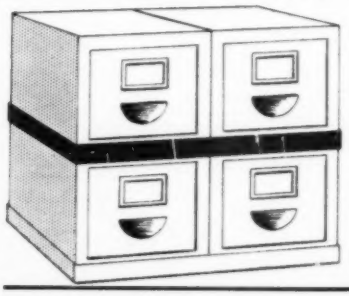

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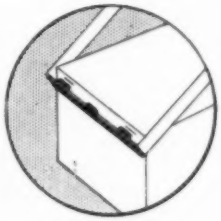

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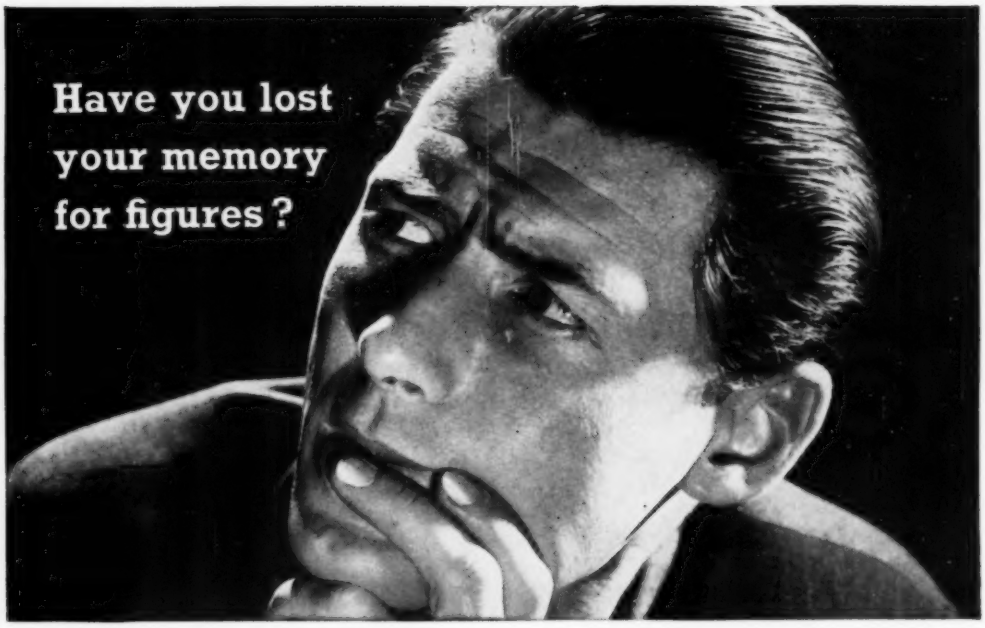

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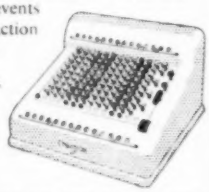

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The MARCH of BUSINESS

"IN SHORT SUPPLY" AGAIN

THE prognostication of BUSINESS editorial staff in the January issue that impending shortages of material would be more severe than Ministerial pronouncements had admitted, has been speedily borne out. The restriction on supplies of zinc and copper and the announcement that coal would be imported from America actually anticipated publication of the issue.

Since then, the Ministry of Supply has reported to the London and South-Eastern Regional Board for Industry that shortages of material, especially metals, are overshadowing the whole picture of production. The Admiralty has also reported growing difficulties in obtaining almost all raw materials, while the Board of Trade has stated that adverse effects on export trade are already apparent. Delivery dates are widening and orders for raw materials are being refused even though materials are required for exports to America.

The main difficulty is not so much a physical shortage of materials—as shown in January, output of practically all home-produced materials is rising. But demand is rising even more rapidly, and British industry has not yet been given a clear directive as to what its part in the rearmament programme must be, nor has it been told the order of priority in which it must deal with rearmament, exports and home orders.

Until decisions on these matters can be given to the practical man, chaos will continue to reign; a well-established pattern of priorities, however, would probably end the great majority of grumbles about raw material shortages very rapidly.

WHAT OF 1951?

FOR reasons of time and space, two of the messages received from leading industrialists for publication in the January issue of BUSINESS had to be held over.

Mr. F. J. Stratton, C.B.E., managing director of Upsons Ltd., manufacturers of *Dolcis* shoes, wrote:

"The leather and footwear trades are facing an obscure and more difficult future. Towards the

F. J. STRATTON, C.B.E.
Managing Director,
Upsons Ltd.

middle of 1950 productive capacity had overcome consumer demand for the first time since the war. Retail stocks had been built up (in some instances to a dangerous level) and there appeared to be reasonable hope of a much needed decline in prices and improvement in values. The international situation arising from Korea has led to phenomenal increases in the prices of all raw materials needed in the manufacture of footwear, notably leather and rubber, and at a time when the public purse is unable to stand further burdens it is inevitable that footwear prices will increase, though all concerned with the industry will fight to keep them down.

"Good progress has been made during 1950 in selling shoes and leather to dollar markets and figures show a substantial improvement on the previous year. Here the price situation following the devaluation of the £ remains relatively in our favour, though I expect to see greatly increasing competition in America directed against those lines which have been specially successful. Nevertheless, there is plenty of business to be done and we shall get a valuable share of it if we continue to tackle the problem of selling with a really inspired and aggressive merchant adventurer spirit. Unhappily much is done to impede merchant adventurers nowadays. The problem of incentives has been discussed *ad nauseam* but nothing has been done yet to reward enterprize, either abroad or at home. It is not good enough that we should depend indefinitely on public spirit in these matters. Taxation is too high.

"Similarly I believe it to be desirable that we should have a tidying up of the purchase tax situation which, in the footwear trade, operates to the detriment of the best and most style stimulating elements in the indusry. It also acts as a discriminatory tax against imports and gives an impression which does not help us in our business dealings with other countries. It is highly desirable that we

Cmdr. S. C. LYTTLETON, O.B.E.
Managing Director,
Army & Navy Stores Ltd.

should make ourselves beyond reproach by distinguishing clearly between taxation applied for revenue raising and taxation for other purposes (*e.g.*, for the limitation of consumer demand) which however desirable during wartime should not be allowed to persist a minute longer than necessary."

The taxation problem also worried Commander S. C. Lyttleton, O.B.E., D.S.C., R.N.(Retd.), managing director, Army & Navy Stores Ltd., who wrote:

"To see into the future was never more difficult, and the present un-

12

REASONS WHY
YOU SHOULD USE
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ALLOY CASTINGS

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2
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settled days discourage prophecy. Nowadays a retailer's costs are largely determined by authority, and while his operating expenses increase, his profit margins remain rigidly controlled. Moreover, with the appalling weight of taxation, both direct and indirect, which the people of this country have to bear, there is little of the family budget left to spend after the absolute necessities have been bought.

"On the other hand, it was upon these essential household needs rather than upon the uncertainties of the luxury trade that the Army & Navy Stores were established. Further, in large department stores a wide range of merchandise means that at least, when the outlook is unsettled, sails are set to catch whatever favourable breezes may blow. During 1951, festival year, we celebrate our 80th birthday."

CHANGING BRITAIN

THE general impression that, after inevitable post-war adjustments, the British economy has settled down to a stable, and even stagnant, pattern is rudely shattered by the new edition of the *Marketing Survey of the United Kingdom*. (Business Publications Ltd. 105s.). Rapid changes have taken place and are still taking place in the distribution of population and of wealth, and in the relative importance of industries. No businessman can afford to ignore these changes, which are set out with a wealth of detail in the new survey.

The fastest growing areas in the country are the North and West Midlands with the area from Shrewsbury to Bristol in the lead. No area near Birmingham has shown a fall in population since 1938, and Sutton Coldfield has added as much as 30 per cent. to its population—no mean fact in face of the housing position.

Perhaps the most important single section of this 600-page compendium is a new Income Levels Index for the 145 largest cities and towns in Britain. Based on a field research covering 7,000 different households every quarter over three years, the index is calculated by ingenious statistical methods to show the relative wealth of the various towns covered, and the rate at which it is changing.

The most prosperous towns are Bournemouth and Hove, with 119

SALIENT FIGURES OF THE MONTH

	Latest Month	Increase (+) or Decrease (—) on a Month Ago	Year Ago
"BUSINESS" INDICES			
Production (1946=100)	* 138.3	+ 1.2	+ 10.9
Purchasing Power do	* 110.0	+ 1.6	+ 1.3
MANPOWER			
Total manufacturing industries (thousands)	* 8,543	+ 43	+ 190
Cotton spinning and weaving do.	* 333.6	+ 1.5	+ 8.2
Coal (on colliery books) .. do.	686	— 2	— 23
Reg. unemployed (U. K.) .. do.	326.1	— 0.9	— 24.5
PRODUCTION			
Index of production (1946=100)	* 150	+ 6	+ 15
Coal (average weekly output) .. (thousand tons)	4,404	+ 57	— 94
Steel ingots and castings (do.) do.	336	+ 8	+ 21
Cotton yarn (do.) .. (million lb)	* 17.55	+ 1.34	+ 0.72
Woven wool fabrics (do.) (million linear yards)	* 42.15	+ 3.12	+ 3.20
Passenger cars (do.) (thousands)	11.63	+ 0.28	+ 2.33
Commercial vehicles (do.) .. do.	5.45	+ 0.01	+ 0.48
Permanent houses completed .. .. .. do.	17.45	— 0.15	+ 0.96
TRADE			
Value of imports (£ millions)	234.9	+ 11.9	+ 33.9
Value of exports .. .. do.	211.8	+ 9.6	+ 51.4
Freight train traffic (million tons)	5.75	+ 0.26	— 0.13
Retail sales .. .. (1947=100)	†147	+ 5	+ 10
FINANCE			
Currency in circulation (£ m.)	1,251	+ 4	+ 8
Deposits in London Clearing Banks .. do.	6,251	+ 47	+ 185
Provincial cheque clearings (av. working day) .. do.	7.32	+ 0.52	+ 0.94
WAGES AND PRICES			
Weekly wage rates (1947=100)	113	+ 2	+ 4
Retail prices (1947=100)	116	+ 1	+ 4
Wholesale prices (1930=100)	†291.6	+ 3.2	+ 50.5
Basic materials do.	†567.4	+ 20.4	+ 260.1
Intermediate do.	†330.5	+ 4.3	+ 59.2
Manufactures do.	†243.9	+ 1.4	+ 17.0
Import prices (1938=100)	147	+ 4	+ 27
Export prices do.	125	+ 2	+ 11

* October. † December. All other figures refer to November.

"BUSINESS" INDICES (1946=100)

How to cut absenteeism

The main cause of lost time in industry, according to the Medical Research Council, is sickness absence. Much of this absenteeism can be traced to the transmission of contagious ailments through the use of communal towels.

Roller towels mean waiting and congestion —lost hours — transmission of germs — expensive laundry bills.

Moisture Magnet: Hi-Dri towels absorb every drop of moisture. Will not disintegrate when wet.

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PAPER TOWELS

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per cent. of the national average. The least prosperous are ports in which shipbuilding and repairing are important, and the old coalfields. Bootle is nine points under the national average at 91 and Wallsend and Merthyr Tydfil are down to 89. These towns are also losing population, and the figures suggest that there is a definite correlation between the rate of change of population and the level of income. Growing towns tend to be rich—Guildford, which has doubled its population since 1931 has an income level 17 points above the average — while declining towns tend to be poor.

Catering is the fastest growing industry in the country, with 40,300 new catering outlets opened between 1946 and 1948. Of the total of 203,600 outlets, 108,600 represented restaurants and cafes, 8,300 hotels, and boarding houses, and nearly 4,000 snack bars, milk bars and other outlets.

PURCHASE TAX EXTENDED

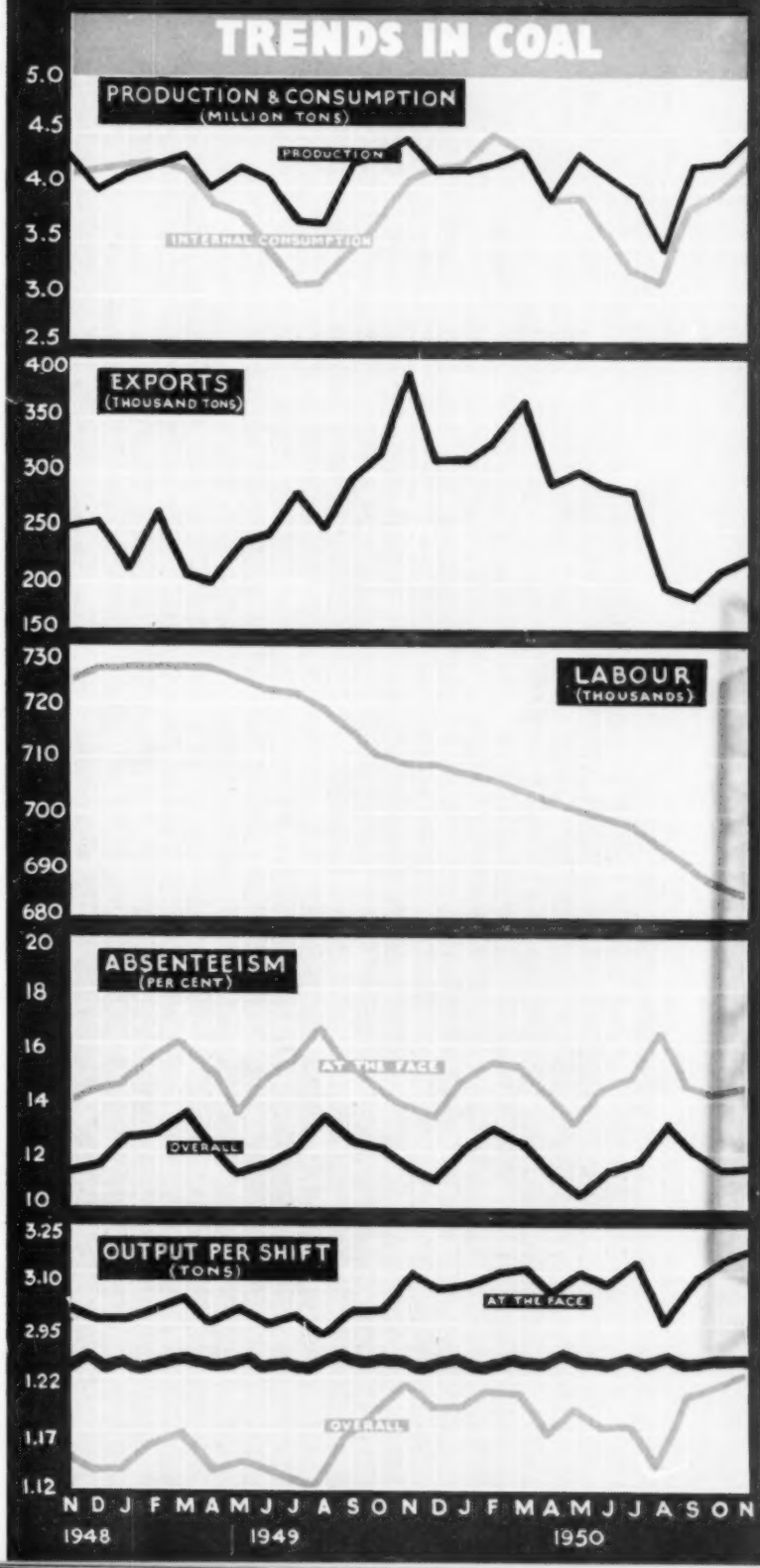
MANY firms in recent years have started producing their own letter-heads, production control forms, and other forms required for internal organization. Economies in cost have been effected by this means, if only because pre-printed forms purchased from an outside firm are subject to purchase tax.

Under a new order, The Purchase Tax (No. 1) Order, 1951, firms manufacturing their own stationery become liable to registration for purchase tax purposes as from February 12, 1951, and must pay tax on the stationery they produce, even if it is merely for their own use.

As a working arrangement, however, businesses using their own office duplicating machinery

HOW THE CHART IS CALCULATED

The graphs show total output of coal (deep-mined, plus opencast), domestic consumption of coal, the number of workers on colliery books, and the percentage rate of absenteeism.



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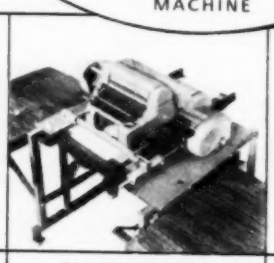

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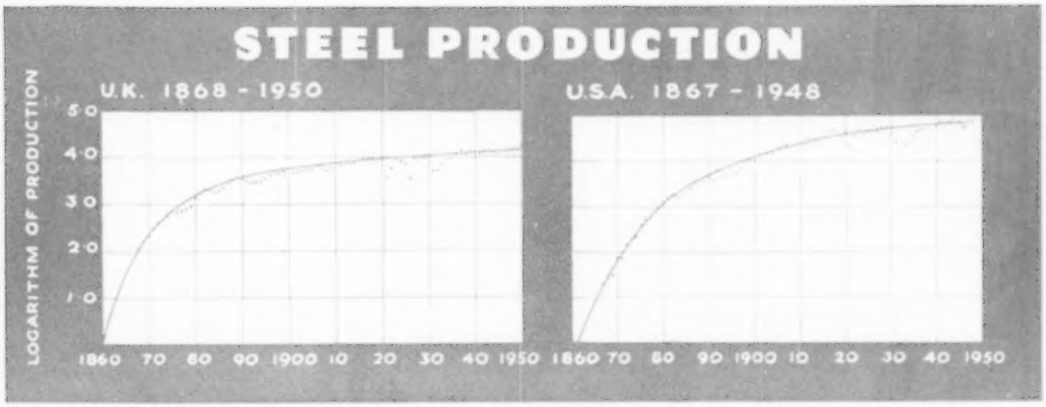

will not be registered, provided (a) that purchase tax has been paid (where chargeable) on the paper used; (b) the total cost of paper used (including tax) does not exceed £250 a year, and (c) the stationery is solely for use in their business. Firms not covered by this arrangement, however, must register immediately on Form P.T.1., obtainable from their local Officer of Customs and Excise.

LABOUR TURNOVER

RISING production and full employment have brought the importance of labour turnover into sharp relief; at present, out of the 8,000,000 people employed in manufacturing industry, over 250,000 change their job each month, or about 3,000,000 a year.

Since every new entrant to a firm must be trained for the job, and will initially have a low output of products and a high output of scrap, the total cost of these changes is obviously considerable. Just how much is involved nobody knows, but H. J Furness, in a paper read to a London Regional conference of the Institute of Cost and Works Accountants, quoted the case of four companies, employing some 2,500 to 3,000 workers, who were spending £58 per annum per worker due to labour turnover.

This figure included both "preventive" costs (expenditure on personnel administration, medical services, welfare and canteen services, and pensions schemes) and "replacement" costs (expenditure on training new entrants and costs arising from their inefficiency and similar causes).

There are still businessmen who regard "preventive" expenditure of this nature as pure philanthropy, but the measurement of "replacement" costs in terms of money may convince them of their error. Obviously, if a pound spent on a pension scheme can save thirty shillings lost through the replacement costs caused by a dissatisfied employee, that pound is a sound investment on the most mercenary of criteria.

HOW INDUSTRY GROWS

SOCIALIST planners are fond of suggesting that the pattern of industry under private enterprize was (and overseas still is) chaotic, since decisions on such factors as the size and location of individual units in the various industries were made arbitrarily by individuals without reference to anything except their own interests. Centralized planning, by reconciling such matters with the national interest, can, they suggest, evolve a better pattern on a reasonable and reasoned basis.

In the third Harold Wright lecture, Sir Andrew McCance recently showed that the British steel industry, born in the 1850's, has, in spite of the "diverse and confused" issues controlling development in a free economy, nevertheless grown in accordance with a well-defined mathematical law. The same law holds good for a section of the industry—acid bessemer steel—which is now on the decline. Even more strikingly, the American steel industry has, in its completely independent development, followed the same path. The constants in the equations differ, but the form remains the same.

The way in which units of different size occur in different proportions also seems to be determined in accordance with a mathematical law; the ratio of the output of the largest unit in the industry to the output of the whole industry is almost identical in Britain and America.

Thus there may well be certain immutable laws, determined by factors which we do not fully understand, but whose existence we must recognize, which determine the pattern of our industrial lives. Such laws the planners can defy only at their—and our—peril.

The giant unit that attempts to defy the law will fail. Sir Andrew quoted the case of the *Great Eastern;* the point has been underlined, since his lecture, by the abandonment of the Brabazon.

PACKAGING

THE current crisis in packaging materials would seem an unfortunate omen for the National Packaging Exhibition at Olympia (January 30th to February 9th). In fact, however, it is in adverse circumstances that the efficient use of new methods becomes of paramount importance. With restricted supplies of material and labour, efficiency in the packing department is a matter of deep concern to managements. How much can be done to improve that efficiency is shown in the four case histories published in this issue.

One of these is illustrated by the cover photograph, specially taken by a BUSINESS photographer. This shows one of the packing departments of Harrods Ltd., which has recently been reorganized.

OFFICE or Factory? what's the difference? Both need machines if we're going to keep AHEAD

"I don't see any difference.
If we used old-fashioned methods in
the factory, we couldn't compete.
And without mechanised accounts
we'd never be able to keep pace.
Old-fashioned ways into a new-
fashioned world won't go.
That's why we decided on Nationals.
So fast...So efficient...
So adaptable...
Best investment we ever made!"

This AUTOMATIC CONTROL BAR is the secret of *NATIONAL* ADAPTABILITY.

Nationals are ideal for any business—large or small. They handle with equal ease, almost any accounting work. To change the job—just change the bar!

Yes ... it's National for Accounting Machines and Adding Machines

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BUSINESS
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Packaging and packing (the two functions overlap in their utilitarian aspect) are heavy consumers of manual labour. The difficult labour position, caused by the shortage of workers and rising wages, suggests that an economy drive in packing departments is probably essential if production is not to be held up, and will in any case certainly yield dividends in reduced costs.

Cutting packaging costs . . .

How Four Firms Saved Money and Labour in their Packaging Departments

By BUSINESS Editorial Staff

WHEN labour saving becomes imperative—as it certainly is to-day—the obvious answer is mechanization; this is as true in packaging as in production. Mechanized packaging is no new phenonomen, and many leading firms have highly integrated packaging lines.

While it is only the larger specialized firm that can invest in such large-scale packaging equipment, there is still a very wide field left where a single comparatively inexpensive machine can replace several operatives, and speed up the output of the packing department while cutting down its labour force and, in consequence, the wages bill.

A wide range of machines for bread-and-butter jobs, such as filling liquids and powders into bottles and jars, is already available, but the ingenuity of the packaging machinery manufacturer can stretch much farther, as instanced by the machine for packing ladies' stockings described on page 42.

Even when the cost of new machinery for packaging would be uneconomic there is still the outside specialist packer.

The development of the new pliable plastics, for instance, has opened up great possibilities. These new materials, however, need equipment that can only be economically installed when large quantities are to be handled. The smaller user, however, can now have his product packaged for him, on a contract basis, by a new packaging service which is described on page 43.

The question of container design brings problems of its own, and questions of economy may be offset by the need for the sales appeal of an attractive pack. In this connection, emphasis is usually placed on packaging for the ultimate consumer. But for many firms, the ultimate consumer is not a retail purchaser but another firm to which it acts as sub-contractor. In such cases, the design of the container in which the goods are delivered must be determined solely on economic grounds. The standardization of containers to facilitate mechanical handling and eliminate manual handling can yield enormous economies in manpower and labour costs, as illustrated in the case outlined on page 44.

Finally, even where mechanization can only be adopted to a very minor degree, because of the nature of the work, higher output at lower cost per package can be contained by concentrating on the human element. A leading West End store got results from simply making the work of the individual operative easier, by ensuring that packing materials were readily available, by organizing the flow of materials so that packers were always fully loaded but never overloaded, and, finally, by providing them with an adequate financial incentive for high output. The scheme is explained on page 46.

CASE HISTORIES

How to cut packaging costs

CASE HISTORY 1

By Mechanization

Formerly the nylons manufactured by Atkins Bros. were inserted into their transparent unit packs by manual labour. The process was slow and there was always a danger of damage through handling. Now, however, an automatic machine does the job efficiently and speedily, producing 1,000 dozen packs per day. Total weekly wage bill for two girls to operate the machine is only £10.

NOWADAYS nearly all nylon, pure silk and rayon stockings manufactured in Britain are sold in transparent unit packs, which serve the dual purpose of protecting the contents and enhancing their sales appeal. Before the war stockings were enclosed and sealed in the packs by women, but owing to difficulties in obtaining female labour the work is now frequently performed by men. The procedure is that stockings received from the dyers are graded and folded into pairs, inserted into the packs, and boxed in lots of six pairs for dispatch. Putting the stockings into the bags by hand is a slow process, the average speed per man for insertion and sealing being six pairs a minute. Another objection to manual insertion is the possibility of damage to fine gauge hosiery of nylon or pure silk.

In 1947 a representative of Strachan & Henshaw Ltd., Bristol, called on Atkins Bros. (Hinckley) Ltd., at their factory in Hinckley, Leicestershire, to discuss the possibility of developing a machine to do the job. This suggestion was so favourably received that a designer was dispatched to the factory to make a detailed study of the operations involved in the insertion of stockings in *Cellophane* bags by hand. Within 18 months the prototype of what is believed to be the first machine in the world for automatically bagging stockings was produced and installed at Hinckley. During approximately one year of operation it has proved convenient, dependable, and simple to operate, and has saved the firm both money and labour.

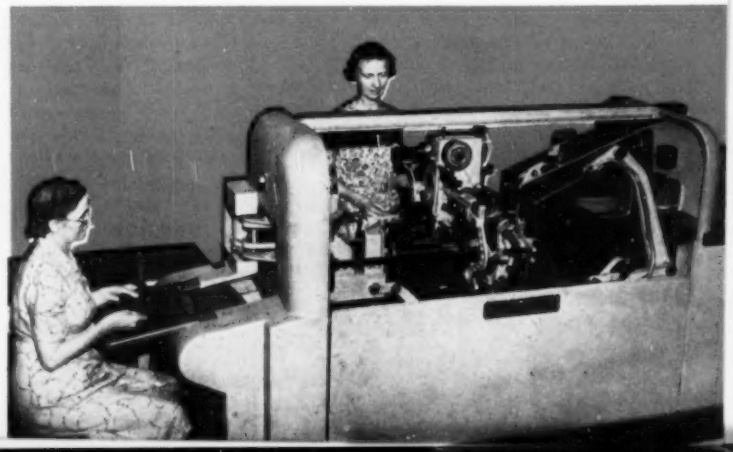
A woman operator feeds the machine with stockings a pair at a time, folded in the normal manner, placing them on to an intermittently moving belt, with either side uppermost according to the style of pack desired. Before the start of each run the *Cellophane* bags are placed in a renewable magazine which is dropped into a hopper holding about 500 bags. The machine inserts each pair of stockings into a bag, folds the top of the bag to produce a packet about 7in. x 5in., secures the packet with self-adhesive tape, and affixes a seal bearing the size or identity marks. The neat and attractive packets are then delivered on to a slow running belt in piles of six. These are inspected by a second operator and removed for packing into boxes.

On entering the machine, each pair of stockings is contacted by an automatic detecting device and a pin wheel mechanism is set in motion, which ensures that in due course a bag and an adhesive tab are fed for that particular pair of stockings.

The feed operator endeavours to keep the machine fully loaded, but in the event of a miss no bag is fed from the magazine and all other packing operations in the sequence are automatically cut out. Full protection against almost all other possible contingencies is provided by further controls, which detect the absence of a bag or tab and finally of an expected pack at the delivery station. When any of these trips operate the machine is brought almost instantaneously to a standstill, thereby protecting the mechanism and preventing damage to the stockings. Thus the operation of this automatic packer can safely be entrusted to unskilled labour.

Flexibility is provided by a range of bag width adjustment, which enables all normal sizes of stockings up to a certain maximum thickness to be satisfactorily packed.

For bagging stockings by hand men are paid at the rate of 9s. 4d. per 100 dozen pairs. The output of the automatic packer ranges



With the aid of this machine, two women do the work of five men

from 20 to 30 packs per minute, depending on the skill of the feed operator and the type of stocking being handled. With normal trouble-free running, the machine is capable of bagging and sealing about 1,000 dozen pairs a day, or 5,000 dozen pairs in a 5-day week. This output is achieved by two female operators at £5 each per week, the total wage bill of £10 per week representing a saving of £13 6s. 8d. on the amount paid for a corresponding quantity bagged by hand. Maintenance costs must also be considered, but these are relatively small and amount to perhaps two man-hours per week at 5s. per hour. It is evident, therefore, that even with a liberal allowance for depreciation the margin is quite sufficient to justify the initial cost of the machine.

Scarcely less important than the reduction in packing costs is the fact that mechanization enables two female operatives to achieve the same output as five men putting the stockings in the bags by hand, thus helping to alleviate the general shortage of labour in the hosiery industry.

Automatic packing involves no alteration of the existing procedure in the packing department, since the preliminary folding operation is exactly the same whether the stockings are put into the packs by hand or by machine. The subsequent boxing operation also remains unchanged.

Now that the prototype has been thoroughly tested, Strachan & Henshaw Ltd., are building six more automatic stocking packers and have orders on hand for many others. In the light of experience in actual operation the original model has been modified in certain minor details and the maximum speed of the new machines will be in the region of 35 packs per minute, representing a further valuable saving in costs and labour.

CASE HISTORY 2

By Using New Packaging Materials

Attractive, serviceable packs for a wide range of powders, creams and liquids can be made from flexible plastic materials. And fortunately smaller firms need no longer feel shut off from this important modern development because costly equipment is needed. A new service is available which does the packaging on an economical contract basis.

PACKAGING small quantities of liquid or semi-liquid substances for retail sale has always been an expensive proposition. The cost of attractive bottles, jars and tubes is often higher than that of the contents, and the subsequent handling of these fragile containers demands care if breakage losses are to be avoided.

One solution to this problem that has been rapidly gaining ground in recent years is the flexible plastic envelope which can be filled with liquid, cream or paste and then sealed to give a completely leak-proof joint.

These envelopes offer many advantages over traditional forms of packaging. They are cheaper, unit for unit, in first cost. They will withstand rough handling, and may even be sent through the post without further protection—thus providing an ideal method for distributing small samples to prospective customers of products normally bought in bulk. They will protect their contents from attack by moisture, most forms of common chemicals, and deterioration. And finally, they are—or can easily be made—as attractive as any other form of packing.

Hitherto, the main disadvantage of these materials, from the point of view of the small firm, has been the capital expenditure needed for packaging and sealing equipment. This disadvantage has now, however, been removed by a service offered by a London firm, Ashe Laboratories Ltd., which will package bulk supplies in plastic envelopes on a contract basis.

Ashe first came into the plastic envelope packaging field when they introduced one of their own products, a new shampoo, in this form. Two different materials are used—

Plastic envelopes are made, filled and sealed on the same production line.

Plastic envelopes can be made highly decorative.

polyvinyl chloride (PVC) and a laminated rubber hydrochloride-aluminium film, known by the trade name of *Pliofoil*.

PVC is tough and compatible with many types of liquid, semi-liquid and powdered chemical and similar products, including alcohols, lubricants, several acids and hygroscopic and deliquescent materials. It is translucent, giving a full view of the contents. It is waterproof, and gives full protection to the contents, but is not completely impervious to air and moisture vapour, and so is not recommended for creams, which would tend to dry out in prolonged storage. It is also unsuitable for packaging foodstuffs.

Pliofoil has all the advantages of PVC, and in addition may be safely used for creams and foodstuffs. A rubber hydrochloride film alone tends to deteriorate on exposure to strong sunlight, but this shortcoming is avoided in the laminated film.

Ploifoil is also easier to seal than PVC, and needs only a pressure from a hot iron instead of the high-frequency heat needed by PVC.

Ashe staple or seal both types of envelope into a piece of light-weight board—a so-called catch cover—which acts as a point-of-sale advertising medium for the product. It also gives the name of the manufacturer, a description of the contents of the envelope, and instructions on their use.

As the capacity of their filling and sealing machines proved greater than was necessary to deal with their own products, Ashe have now "taken in" packaging in PVC and *Pliofoil* envelopes for other manufacturers. The standard size envelope used for their own shampoo is 3¼in. x 2in., but larger sizes can be handled in PVC—up to about 12in. x 5in. if necessary.

These plastic envelopes are decidedly cheaper than bottles. Ashe will supply *Pliofoil* envelopes and fill them to requirements at a rate of about 5s. 2d. to 6s. 9d. per gross, depending on quantity. Catch covers cost about 2s. per gross, depending on the amount and standard of printing required. PVC envelopes, filled to requirement, cost from 9s. 2d. to 10s. 8d. a gross, plus the cost of catch covers. The *Pliofoil* service is thus something like 50 per cent. cheaper than bottles and also enables economies to be made in postage and outer packing. These prices, however, are likely to be increased owing to the constant upward trend in the cost of raw materials, but so are those of bottles and other containers.

Ashe's packaging plant at Leatherhead, Surrey, is capable of producing up to 100 gross of filled and sealed envelopes per eight-hour day; it is, however, only economical with long runs, and for this reason the firm will not normally accept orders for much less than 300 gross. For the small manufacturer sending out only a few hundred samples each month, however, they will supply ready-made *Pliofilm* envelopes, at 4s. 6d. per gross, which can be filled by the customer and easily sealed with an inexpensive heating iron.

The range of products that has been handled by the service, during the few months it has been running, vary widely, from Ashe's own shampoo through flavouring agents, foodstuffs, antiseptics and fine chemicals to such unexpected commodities as duplicator inks.

How to cut packaging costs

By Standardizing Containers

When Vauxhall Motors standardized their containers in two sizes to facilitate mechanical handling and storage, there were big savings in manpower and production time. Even more so when several firms supplying components to Vauxhall "came in" on the standardization and agreed to use the containers themselves.

TO the average man, packaging suggests the rows of highly-coloured tins, jars and cartons on the shelves of shops. But while retail packaging is extremely important, it still remains that a very large proportion of the total output of goods is sold not to retail consumers, but to other manufacturers, in the shape of raw materials, components, etc. These goods, too, must be packed for protection against damage during transit, and for ease of handling.

This question of ease of handling has assumed considerable proportions in recent years. The planning engineer, formerly concerned with floor-to-floor times, is increasingly enlarging his view to cover door-to-door times, since where it is possible to save a few seconds on machine time, often minutes or hours can be saved on handling.

When Vauxhall Motors Ltd. planned their great new factory at Luton, Beds., the question of handling and packaging was brought in at a very early stage.

It was set out as a cardinal principle that manual handling should be cut to a minimum to reduce fatigue and that all components should be received and moved, not as individual units, but as bulk supplies in suitable containers, which themselves, wherever possible, should be moved in multiples.

The question then arose as to the design of the most suitable container. In order to facilitate handling and storage, containers were limited to two sizes, 2ft. x 3ft., and 4ft. 3in. x 3ft., containing 8 and 20 cu. ft. respectively. These containers were designed for stacking, so that permanent fixtures and shelving could be eliminated and maximum use made of floor—and air—space. Considerable ingenuity has been expended in devising modifications of these containers, and of pallets of the same overall dimensions, in order to accommodate various awkward shapes.

Over 6,000 of these standard-size containers are now in use, handling 4,500 separate items of stock. Where the items are small, sub-units are constructed to fit inside the standard containers. They are handled in the factory by 15 6,000lb. fork-lift trucks (to be increased to 20) and powered hand trucks.

In the initial stage, use of the containers was restricted to storage and internal transport in the Luton factory. Goods were received from suppliers according to their usual practice; some came in bulk, piled up on a lorry, some came carefully packaged in individual cartons and made up in gross packages. These were all loaded into and unloaded from the lorry by hand and then loaded from the dock into the Vauxhall containers by hand, with all subsequent movement mechanized. While economies were obtained in the factory, there was still room for improvement in transit beween supplier and Luton.

Standard sized containers can be adapted for many special purposes

In the second stage, Vauxhall managed to persuade a number of suppliers to use the Vauxhall containers for actual transport between the two works. In the last manufacturing operation (normally inspection), the components were loaded directly into the Vauxhall container, which was then loaded and unloaded mechanically on to and from the lorry and passed straight to the stores. As a corollary to this process, inspection methods had in some cases to be modified and much receiving inspection was eliminated. This in itself led to further economies. Assuming that it takes an inspector one day to inspect one day's output, Vauxhall were previously forced to hold one day's stock in addition to that required for the factory. Without the need for full receiving inspection, this additional holding is no longer necessary. The process has thus substantially reduced stocks.

The third stage came when the supplier began to ask himself: "Why should I load on to Vauxhall containers at the *last* operation?" He had his own internal handling problems, and in some cases has now solved these by using the Vauxhall containers for transporting the component through the whole production cycle.

Concentration on container design and cost has led to economies not merely in handling, but also to economies in technical problems of design. In the production of a petrol tank, for instance, two alternative methods were proposed. It was found that of the two different manufacturing methods, one

showed marked advantages when considered from the handling view point. For instance, one method required six times the amount of handling equipment and storage area to accommodate the inter-operational stores. This in turn increased the trucking frequency six times.

Thus the concept of the standard container has led to considerable gross economies in production costs. Against these must be set the expenditure on the containers. This is a capital expense borne partly by Vauxhall and partly by the supplier, and is justified in the same way and on the same terms as other capital expenditure.

A more serious consideration is the fact that the containers cost almost as much to return empty as they do to send full. Something can (and has been) done to encourage return costs by designing collapsible types of container. But even when the real costs of the system have been fully discounted the net economies have fully justified Vauxhall's initiative.

With corrugated board and wrapping paper slung in rolls, packing becomes easier and quicker

How to cut packaging costs

CASE HISTORY 4

By Improving Working Methods

Following reorganization, output per worker in the packing departments at Harrods has risen rapidly and is now well above pre-war standards. This has been achieved almost entirely by concentration on human factors: the work of individual operatives has been made easier through improvements in layout, and a simple but effective incentive scheme has been introduced.

THE obvious answer to productivity problems in the packing department is mechanization. But mechanization is not always practicable, either because of the nature of the products handled, or because the necessary machinery is not available.

When Harrods Ltd. started the reorganization (not yet fully completed) of their packing departments, they had already gone about as far as they could in mechanizing handling operations. But the despatch sections, which together employ some 450 workers in all phases of handling and despatch operation, including 100 persons engaged solely in packing routine, are called upon to pack anything from a live animal to a grand piano. No packaging machine can achieve the flexibility necessary to cope with such a range of goods, and in an effort to achieve a return to pre-war output per worker, Harrods were forced to concentrate on the human element.

The reorganization was carried out in three stages:

1. Wherever possible, standardized returnable cases were devised which eliminated the construction of a special package for each consignment;

2. By planning layout of the department, constructing special packing tables, and linking these to a central checking and dispatch point the work of the individual packer was made easier, and

3. A simple incentive bonus scheme was introduced which gave a stimulus to output.

The use of prefabricated packing units has involved a switch of packing materials. Previously, for instance, all carpets were sent out stitched up in hessian—a method that made drastic calls on the skill and time of the packer. To-day a returnable fibreboard case has been devised, in various lengths, into which the carpet, wrapped in brown paper, is dropped.

When the case is empty, the lid overlaps the body to a considerable degree. Thus it can be extended or retracted to give a fair amount of flexibility for carpets of different widths. The case is fastened by a standard leather strap and buckle, and the buckle sealed with a tin or solder seal. A label is pasted on and the case is ready for dispatch. The operation time for packing a carpet has thus been reduced from an hour or more to minutes.

Similar rectangular fibreboard cases are being increasingly used for the dispatch of miscellaneous goods previously sent in wooden crates specially made in the case-making department. Dolls' prams, for instance, have been rapidly and successfully packed in this way. Prefabricated wood cases are also being used, an interesting example (still in the prototype stage) being a pyramidical case for shipping standard lamps.

Where prefabricated cases cannot be used, as, for instance, in postal dispatch, the packers' work has been lightened by improved working conditions.

In the past, the packers worked standing at high tables. Goods were handled by porters, and wrapping paper and corrugated cardboard were stacked in sheets on the bench. Each packer wrapped a parcel from the goods put on her bench and pushed it across to a checker, who checked it. A porter then removed it for weighing and stamping. This system was wasteful of manpower—there was one

checker for each packer, and all documents were made out in duplicate. Since most of the packers are elderly women, fatigue caused a terrific falling off in output towards the end of the day.

Under the new dispensation, the long bench has been replaced by a series of individual tables at which the packers sit. These are arranged at right angles to a light powered conveyor belt. The tables, which were constructed specially by Harrods themselves, have the corrugated fibreboard mounted on a roll on the packer's right. Brown paper is mounted on another roll slung under the desk and brought up over the back of the table, where it is held in position by a tension bar which also acts as a knife for ripping off the required length. String (and cellulose tape) is kept in a drawer on the right, and fed through a small hole in the front. There is also a personal locker to hold the operative's handbag, etc. The table top is simply pegged on, so that it can be easily and rapidly replaced when worn.

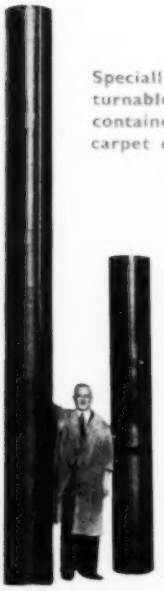
The goods to be packed are brought to the department by elevator and moved to a long bench parallel to the conveyor. From here they are passed to the individual packers at their tables. After being packed, they are put on to the conveyor, which takes them to a central table where they are checked, labelled (where necessary), and stamped before being placed in mail bags slung on special stands.

The net result of the reorganization is that the number of porters and checkers has been substantially reduced, the amount of paperwork halved, and the work of the packers themselves made easier and less fatiguing. Paper and board in rolls is also cheaper than in cut sheets. For all these reasons, output per worker has risen rapidly, and has now greatly exceeded pre-war standards.

Similar arrangements are being made in the light packing departments, where goods are mainly packed in light wooden crates. Here, a gravity conveyor is to be installed in place of the powered conveyor in the postal department, while the tables have been modified to meet the special needs of the department. Brown paper is still slung on rolls under the table as in the postal section, but additionally a special recepticle is provided under the table for straw. Metal trays at the side of the bench contain supplies of nails, tacks, etc.

In the heavy packing department, goods are shifted with hand trucks, and a special version of the tables used in the light packing department has been devised on a mobile basis. Equipped with corrugated board on a vertically-slung reel, the table has the same trays for nails, etc., with a rack for saws, and is mounted on rubber-tyred metal wheels. It can thus be rapidly wheeled to the goods requiring packing.

A mobile table holds tools and packing materials for heavy packing



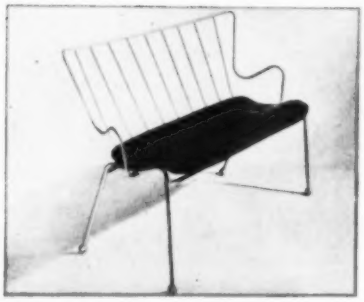
Specially designed returnable fibreboard containers have cut carpet delivery costs

To secure the fullest utilization of the new methods, an incentive bonus scheme has been introduced. The use of time study methods to determine standard times as a basis for individual bonuses was considered but discarded, partly because it was felt that these would be too complicated in operation, and partly because of the fear of personnel difficulties.

Instead, it was decided to work on a departmental bonus of the simplest possible nature. From records going back many years, the average daily output of each department was calculated and a standard performance for the department set at a figure slightly below this. A fixed bonus of a shilling a package (in the freight section) and 10 per cent. per 100 parcels (in the postal section) is paid output dispatched in excess of the standard, and the total bonus earned by the department is divided among all workers in the department in proportion to the basic wage earned.

Records are easily kept up to date, and each worker is informed every morning of the amount of bonus earned on the previous day. The incentive value of the bonus is thus strong. So is the disciplinary value. Deliberate slackers get short shrift from their workmates, while the willing worker who is a bit slow receives a helping hand.

Look Out for WHAT'S NEW

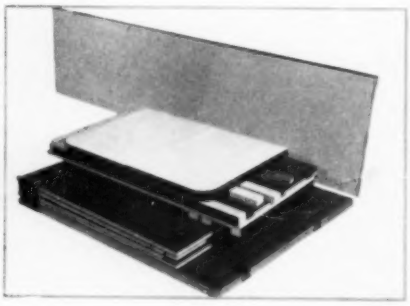


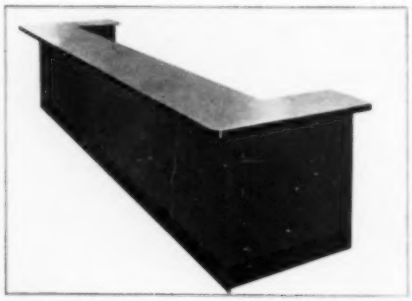
NESTING ANTELOPE

CLEAN and modern, the Antelope chair is a new design available in single and two-seater versions. Elegant enough for the executives' offices, it has the added advantage that it "nests." The frame is of welded steel rod which is stove enamelled, and the seat is moulded cellulosed plywood. The nature of the materials provides a certain amount of "give," which is claimed by the manufacturers to allow more comfort than the conventional tubular steel chairs.

EYE-OPENER

EVEN eyes of potatoes and the cores of apples can now be removed mechanically, ceasing to be "hand operated" jobs. The Streamline machine does the work of four men and cuts wastage by 50 per cent. The potato is held against a swiftly revolving drill head, operated by an electric motor, which is enclosed in an aluminium casing. For removing apple cores a different head is fitted. The drill is designed to avoid injuring the user's hands.





TRANSPORTABLE BAR

THOSE who have to organize receptions, dances, etc., in showrooms, offices, and halls or other premises not designed for such functions, will welcome this new transportable bar. With the exception of the centre counter section, the whole outfit folds up into a compact "box" (as seen on the left) measuring 4ft. by 3ft. 6in by 10ins. Put together, you have a 16ft. long, 2ft. broad counter, the wings at the end being 4ft. deep. To assemble or dismantle takes two men only ten minutes. The bar is surfaced with a buff and cream weave plastic material which is scratch resistant, and immune to spilt alcohol. The front and sides are finished in a plastic reproduction oak veneer.

How Efficient Work Flow Assists Production

By A. G. THOMSON

In the manufacture of intricate machines, requiring thousands of precision-built parts, management's top tasks lies in ensuring that the parts are available in the right numbers at the right time—and at the right cost.

Only thus can hold-ups be avoided. Only thus can production be economical.

This was the problem facing National Cash when beginning to make the all-British *Class 100* machine.

Since each machine has 2,700 parts, the problem was formidable. This article explains how it was solved by a careful system of production and stores control.

FOR many years, the National Cash Register Co., Ltd. in Britain was essentially a selling and servicing organization for its parent company in the United States After the war, however, it became evident that imports from dollar sources were likely to become increasingly difficult. It was therefore decided to set up a manufacturing plant in Britain to supply not only the home market but the sterling area in general and European countries short of dollars.

In July, 1946, the assembly of machines from parts imported from the U.S.A. was started at Dundee by the newly formed National Cash Register Co. (Manufacturing), Ltd. A tooling programme for the production of components was also put in hand, and when this is completed the Dundee factory will employ some 2,800 people, as compared with its present force of about 1,700.

Tooling for *Class* 100 cash registers has been completed and output is now at a high level per day. Each machine has approximately 2,700 parts, all of which are produced in the factory apart from a few items which are contracted out. A number of models with different keyboard arrangements are produced.

Besides manufacturing *Class* 100 cash registers complete, the factory assembles two electrically-operated cash registers of a highly specialized type, known as the *Class* 1500 and *Class* 6000, which are, to a substantial extent, built from parts sent from the United States, so that output is necessarily on a very limited scale. Also assembled mainly from imported parts are the highly complex *Class* 3000 accounting machines which have from 8,000 to 10,000 components each. A further class of products, adding machines, are at present in the transition stage, being built partly from British and partly from imported parts. Here again, the number of components is very large and a further complication is presented by the assembly of a number of models with variations in keyboard arrangements, etc.

In developing the production of the all-British *Class* 100 machines, a very difficult control problem was presented by the enormous range of precision-made parts required for each machine. To keep down production costs components should ideally be produced in quantities of perhaps 50,000 at a time, but in order to keep the assembly lines going complete cycles of parts are required, involving the necessity for short runs To maintain rigid

A visible index system is used in production and stores control.

General view of office, showing printing and embossing machines, and cabinets for plates.

The production control shop office

control over all the assembly lines and eliminate the risk of hold-ups through depleted stocks of any one of thousands of components, at the same time achieving maximum economy in the machine shop, a very dependable system had to be devised for pre-planning production and costing the parts.

When the factory was first started it was decided to introduce a well established system of production and stores control. This system involved an order card, a tracer sheet, and a requisition issued by the Stock Control Department. The time sheets were hand-written by the Time Office. The information for costing was taken from the finished job and a costing copy of the requisition. Rate fixing was done from a separate set of cards with times for each stage of every job. The "due date" was written on the order, which was issued to the machine shop together with the requisition, the latter being passed on to the raw materials or components stores depending on the type of part to be produced, while the order went to the section of the machine shop where the operation was to be done. Jobs were started in due date order, "due date" being the date on which the parts were required in the finished stores.

This system proved quite efficient but failed to give all the information required. Though effective from the standpoint of stock control, it proved less satisfactory from the costing angle, while a serious disadvantage was the fact that time tickets had to be prepared by hand. Another objection was that for every operation on every part the operator concerned had to go to the Time Office and clock on, so that it was not uncommon to find a queue of people at the Time Office. A new system was therefore introduced towards the end of 1949 to achieve the following aims:

Control the issue of orders to the production shop in accordance with the requirements of the production programme and control them through the shop in accordance with that programme;

Ensure that paper work is not issued to the shop until the necessary raw material is available;

Record the quantity of work done on each operation and provide a record of the progress of each job and an index of its location at any time;

Provide a means of informing the operator of the standard times for each operation and credit work done by each operator for wage payment purposes;

Give the operator the necessary particulars;

Keep the amount of machine waiting time between operations to a practicable minimum;

Provide the necessary statistics of production and material issues to the appropriate department; and

Reduce the possibilities of error in information issued to the shop.

In the scheme finally adopted a visible index system is used. The parts are indexed in eight visible index cabinets, each cabinet having 12 trays with 60 envelopes per tray. Each part has a separate envelope, the envelopes being arranged in sub-assembly order. If a part is used directly at the assembly line the envelope has a yellow tag. The parts required to make it have pink tags and are located immediately above the yellow tag. Any parts required to make those with pink tags are

given blue tags and are in turn indexed immediately above the appropriate pink tag. If a part with a blue tag requires any added parts, these are denoted by an amber tag.

Each part has a calendar sheet which is visible and is marked off to denote the weeks of the year, each week being consecutively numbered. A coloured tag is used to show the week up to which machines can be built from the stocks of that particular part in store according to the existing programme. When the current week number is within eight weeks of the tag an order is placed for another quantity of stock. Each index has on the back of it a stock requisition. This is removed and passed over to the printing machine section, where the necessary paperwork is prepared.

Every part to be manufactured has a planning sheet which is made up by the Planning Department of the Tool Division. This sheet carries all the information required by the production shops such as size of material, sequence in which operations are to be carried out, and the tools and gauges needed for each operation. From the information on the planning sheet one heading plate and one operation plate are made up for each operation as outlined on the planning sheet.

The heading plate carries the following information:

Cabinet and tray number, being the position in the visible index cabinet in which the stock control card is located;

Stores location, being the code number recording the location of the finished component in the component stores;

Part number, being the identification code of the component, which is a combination of part number and drawing number;

Name of component;

Material size and description, size being thickness and width or diameter;

Layout number, representing the issue of the layout (For example, "1" would indicate the original layout, "2" that there had been one alteration to the original layout);

Material specification number, being the code number describing the type of material; and

Pounds per hundred pieces including scrap at 5 per cent.

The *operation plate* records the following particulars:

Operation sequence number;

Tool kit number. (This number is composed of the component page number and operation sequence number. It refers to all the individual tools specified in the planning sheet for use in the operation in question);

Cost centre code number, as obtained from the Costing Department's schedule of costs;

Standard hours per 100 pieces, this information being obtained from the standards computation sheet issued by the Standards Department;

Output per man hour, being the output per hour necessary to produce an incentive bonus of 50 per cent;

Operation, being a brief description of the operation as taken from the planning sheet;

Setting hours, being the time allowed for setting the machine; and

Part number.

If the part to be produced is a production assembly, further plates are required with information re-

Close-up view of the machine control panel

Printed forms streamline the paper work

garding the added parts. These are known as *added parts plates* and carry the following information:

Operation sequence;

Part number of the assembly component;

Page numbers of the parts to be added;

Quantity of the added part;

Cabinet and tray number of the added part; and

Stores location number.

When a part is made for the first time a product cost sheet is produced from the printing machine using a set of plates. This sheet is passed to the Costing Department.

When an order is made up for stock the printing machine section receives a stock requisition form from the Stock Records Section, on which the order, quantity and number of boxes have been filled in. A checker checks a set of plates for the parts specified on the requisition and places them on a tray. The printing machine operator loads them into the machine hopper and sets a numbering box which records the date produced, layout number as shown on the heading plate, order quantity, works order number, number of boxes, and the week number of the current week. The operator then prepares the following forms for each works order:

(1) Progress record sheet; **(2)** material requisition in duplicate; **(3)** one identity card for each box; **(4)** a checker's ticket for each operation; **(5)** a tool requisition for each operation in which tools are used; **(6)** a move card; **(7)** a parts requisition in duplicate (if an assembly), and **(8)** a stores receipt.

When all the paper work has been prepared, the checker replaces the set of plates in the cabinet in their correct position and order, checks all the forms that have been printed, and staples them in their correct operation sequence order. The order is then passed to the Raw Material Stock Controller, who calculates the quantity of material required and makes the necessary allocation on the stock record card. The order is then passed to the Production Control shop office, where the progress record sheet is removed. The date of receipt is recorded on the sheet, which is filed in part number order. The remainder of the order is then passed over to the female clerk in charge of the panel in the section where the first operation is to be carried out. Thenceforward it becomes work available for a specified machine group.

FIVE BENEFITS OF PLANNED CONTROL

1. **All orders for parts are printed—no tedious typing.**
2. **Same applies to checkers' tickets—previously hand-written.**
3. **Originally the information required for costing had to be collected from several sources. Now it is incorporated in the planning sheet prepared for each part.**
4. **The cost centre code number on the operation layout gives a definite reference number for the Costing Dept., each code number representing a group of machines or a section of the Machine shop. This has meant more co-ordination between the Costing Dept., and Production Control.**
5. **Under the new system any part can be located at any time, wherever it is.**

Upon receipt of an order at a section, the checker's ticket for the first operation is removed and placed in the "jobs available" slot in the control panel, the remainder of the paper work being placed in the group drawer of work available. All jobs in the various "jobs available" slots are filed in week number order, the job with the lowest week number being done first.

Each machine of each group in each section has two slots in its own control panel, one for the job on and the other for the next job on. When the job on is nearing completion the foreman in charge of the section collects the paper work of the next job on from the "work available" drawer, removes the material and tool requisitions, and places the rest of the paper work in the "jobs waiting" drawer. The material and tool requisitions are sent to the raw material and tool stores respectively with instructions when to deliver.

When the operation is finished the checker's ticket is removed from the "job on" slot and placed with the box of work. The checker then checks the quantity by weighing the work, fills in the quantity on the checker's ticket, and also fills in a check slip which is handed to the operator as his or her record of the quantity of parts produced. The checker's ticket is sent to the Production Control shop office, so that the quantity and date can be entered on the appropriate progress record sheet. It is then passed to the Time Office, where the quantity of work done is recorded and allocated to the operator concerned.

The rest of the paper work for the order is collected by the female clerk of the section and placed in the box or boxes of work, to be picked up by a stock move man. The move card is signed by the man in charge of the section and is also placed with the job of work. The stock move man loads the boxes of work on to his truck and finds out from the move card the section where the next operation will take place. He delivers the boxes to that section and hands the move card for signature to the man in charge. The paper work for the order is handed to the female clerk in charge of the panel at the new section and the order becomes "work available" for that section.

The same procedure is adopted at every section until the final operation has been completed. When the finished work arrives at the component stores there are only two pieces of paper left, namely the move card and stores receipt. The stock is accepted at the stores, checked, and placed in its bin. The stores receipt is signed by the storeman and passed with the move card to the Production Control shop

Continued on page 86

His Versatility and Drive Built Two Businesses

As a businessman, G. N. Bridges has had more than his share of bad luck and frustration. Yet today he heads a firm whose order book is full to capacity. Guts and ability have got him to the top.

By PHILIP F. DYER

TO have built up a prosperous business from scratch at the age of forty is something of an achievement in this day and age; to have done so at thirty, only to see it vanish, and then come back and build up another, equally prosperous, in another field in the next ten years, bespeaks courage as well as ability.

Such is the story of G. N. Bridges, managing director and chief shareholder in S. N. Bridges & Co., Ltd., precision engineers, of Parson's Green, S.W.6. (The discrepancy in initials is deliberate for reasons which will appear later).

Bridges was trained for the drawing office, but preferred to start his working life in a job where he could use his hands. So he learned stone carving and later became assistant foreman in one of the larger marble and granite firms, where his mechanical aptitude inspired him to design and build an experimental machine for working marble, an operation up to that time exclusively done by hand. The firm adopted the machine in a small way only, so Bridges, dissatisfied, hawked it around other stone concerns. Finally, having been unsuccessful, he introduced the machine to an Italian company who employed him to build and install it in their works and quarries in Italy and Belgium. Later he came back to London as the company's salesman, doing well until increased tariffs and the approaching depression put him out of a job.

When the depression was at its worst, Bridges had to take any work offered. So he became an electrician's mate; then, for a short spell, a commis waiter in a West End Hotel; he even operated a pneumatic drill on road repairs. Note that, although times were difficult, *he was never out of work.*

Contractors Hired His Men and Machines

The tide seemed to have turned when Bridges obtained a much better job selling weighing machines; he became a leading salesman, and achieved the best performance for his company. Next he went to a firm selling excavators, concrete mixers and other contractors' equipment, and in a short time, feeling that he had saved sufficient money, took the irrevocable step of entering into contracting on his own account—"since when I have been permanently broke," he states.

Much of the equipment he needed he hired from builders and others who had, say, a concrete mixer lying idle for a couple of months. He was thus able to command a pool of machinery which he could re-hire to a large contractor for specific jobs, such as excavation, reinforced concrete foundations, and brickwork.

To use this machinery, Bridges recruited a team of key workers who moved about the country from job to job, taking on local labour for unskilled work. He has very pleasant memories of this team—good workers all (many of them laid 1,000 bricks or over, in 10 hours)—and wryly contrasts their output with current conditions in the building industry. "I wouldn't touch building to-day!" he adds.

Most of his work was sub-contracting for large contractors. As the country rapidly and belatedly swung into a war tempo, the amount of work increased by leaps and bounds—an aerodrome here, air raid shelters there, and shadow factories all over the place. By 1940, he was travelling 800 miles a week inspecting the various jobs his men were engaged on, and his wife saw him only at week-ends—if then. The office side of the business was in the capable hands of his brother.

Twelve months of hectic travelling and constant overwork, however, took their toll. One night he booked in at his usual West End hotel. Three days later, his wife in Wiltshire was told by the police that her husband was in Middlesex Hospital, having been picked up in Charing Cross Road in a semi-conscious condition. What hap-

pened during those three days was —and still is—a mystery. Bridges himself has no memory of them. No one who knew him had seen him, but he had the same amount of money in his pocket on the Thursday as on the Monday!

Several weeks in hospital followed, but as medical observation revealed nothing organically wrong, he was released—with a caution that any further overwork might bring a relapse. As a result, he wound up his business, letting contracts run out as they completed but taking on no new work. His brother was called up at this time, which made continued activity difficult.

With time on his hands, Bridges turned once more to a little garage in Parson's Green that he had acquired as a sideline in 1937 and almost forgotten. Going down one day, he found the man he had installed to run the place—and the few tools, including one lathe, with which it was equipped—away from his post, as on many previous occasions; this time, when he found him, he sacked him on the spot. Bridges moved in in his place, and for a little time worked happily on the lathe. Sub-contracts were easily enough obtained, but brought complications. In order to get the turning work, he had also to undertake milling and grinding. This meant scrounging for almost non-existent machinery, and taking on workers to operate it. The business became "S. N. Bridges & Co., Ltd."—so named for G.N.'s 3½-year-old son, Simon.

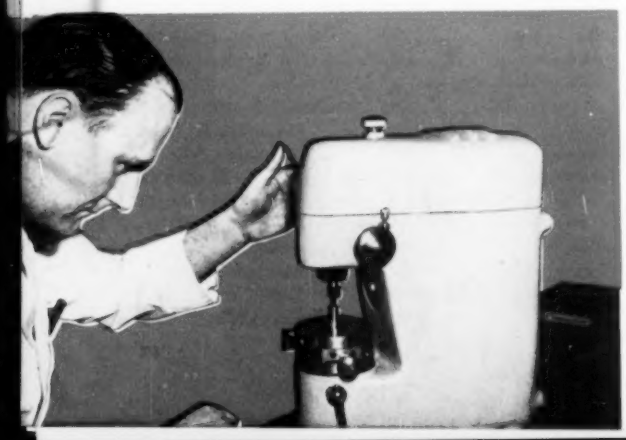
The small two-car garage rapidly became overcrowded. It was the year of Dunkirk, and the Factory Acts went by the board. Soon there were 44 people, together with their machines, in a space that would comfortably hold nine. The office consisted of two soap boxes at the end of a bench, where Bridges tried to do his accounts in off moments from work at the bench. As the tempo accelerated, a night shift had to be taken on. Labour was scarce, and of none too satisfactory a quality, and Bridges found himself forced to work across the shifts in order to get proper supervision. Soon he was doing a 94-hour week again, clocking in with his own workers; fortunately, the relapse the doctors had threatened did not occur.

The type of work that passed through the little shop varied widely. The most noteworthy job was perhaps the production of extremely small drills, down to 0.05mm. (two thousands of an inch), used for boring the minute holes in the injection nozzles of Diesel engines and in instrument making. Before the war, production of these drills had been monopolised by German and Swiss firms. With supplies from Germany cut off and those from Switzerland severely curtailed, a serious bottleneck threatened. Bridges managed to secure and make up some grinding machines used for their production, and trained unskilled London girls in their operation. His output was sufficent to meet the country's wartime needs, and today Bridges' fine drills are being exported all over the world—even to Switzerland.

Peace time uses have expanded—the drills are used for boring the holes in the dies through which nylon is extruded and drawn, for instance. Swiss and German competition is being successfully met on a quality basis; the great Philips Electrical Works at Eindhoven report that they get 50 per cent. more holes drilled with a Bridges drill than with a comparable Swiss or German drill, due to the superior design and quality of the steel.

Meanwhile, the struggle for

Finding that money bonuses lacked incentive value, G. N. Bridges pays his incentive bonus in kind. Targets are set each month for individual workers and for the company as a whole. If the company's target is reached, all workers who have achieved their target draw lots for one of two prizes. These include items such as vacuum cleaners, tea-making sets and radios.



One of Bridge drilling machines

breathing space went on, and after much effort Bridges managed to hire the Scout's hall from the local vicar and moved in some of his machines. In 1941 a bomb took the roof off the garage, but work went on under tarpaulins slung across the rafters. The same bomb demolished the greater part of a large factory some distance up the road, but left one end standing. Bridges tried to rent this, but the firm refused, though they offered to sell him the building (or what was left of it). They wanted £14,000—a figure far beyond Bridges' resources, but he paid £1,000 for a years' option without the slightest hesitation—and without the slightest idea where the balance was coming from.

He was faced with heavy accumulated demands for tax on his wartime profits. Like many another firm in that period, he had only been able to keep the most rudimentary accounts, and, as the firm S. N. Bridges & Co. Ltd. had been non-existent prior to its incorporation in 1940, he had no E.P.T. standard. When, with the end of the war, he finally managed to catch up with his book-keeping, he found that a very large proportion of his liquid reserves had to go to H.M. Collector of Taxes.

The next twelve months were thus a desperate attempt to raise the money necessary to complete the purchase of the new site. Bridges went to most of the City finance houses and found them, in his own words, "a rugged crew."

He tried to raise the sum himself. He increased his overdraft as much as his bank would allow. Although he sold all his personal possessions, he was still some hundreds of pounds short a month before the option was due to expire. During this desperate race against time, he discussed his problem with the representative of the company supplying him with some of his special alloy steels. It was suggested that this company might be interested. A hectic period of interviews, investigations and meetings followed, and it was not until the last minute that the situation was saved—John Brown's took a minority interest, leaving control in Bridges' hands. Two of Lord Aberconway's sons joined the board.

Bridges' difficulties, however, were by no means over. The site was secured, but a new factory had to be built. With strong Ministry of Supply support, Bridges was confident of getting a licence, but his first application was turned down flat. Bridges, however, refused to take "no" for an answer, and protracted negotiations proceeded from 1945 to 1947, finally ending in an extremely stormy meeting of about 20 representatives of the various Ministries involved, at which Bridges completely lost his temper—and got his licence. The new building, to house 400 workers, went up at a cost of £39,000 of which £25,000 came from war damage, and is now in production, with a current compliment of 263 workers.

As War Contracts Ended New Work Was Found

During the three years covering the financing and erection of the new factory, life had gone on in the old premises. As war contracts ran out, new work was found and new products introduced.

The first post-war project was an order for hand tools from the Ministry of Supply under the rehabilitation programme for the occupied countries. These were delivered to Holland, and Bridges took the opportunity to appoint agents at the Hague and Copenhagen. The first product for the home (and export) market was a tangential pipe die that he had "dreamed up" during the war. Quite apart from its qualification for the job it is designed to do, it is remarkable as containing what Bridges claims to be the largest component yet made in this country by powder metallurgy—a significant indication of enterprise in adopting new methods. A sieving machine, a homogenizer and a whole range of power driven hand tools followed in quick and somewhat startling succession. Flying many thousands of miles in the past three years, Bridges has appointed agents in 48 countries and this year established a branch office and service depot in Toronto. In 1949-50 73 per cent. of his output was exported.

The flow of ideas for new tools has by no means come to an end. His first love—the pipe die—had worried Bridges ever since it went into production. It was, he felt, a good job, but it had to be operated manually. Finally, after much worrying, he has solved the problem, and a motor unit will soon be on the market capable of driving existing dies or incorporating with new ones, the power being supplied from a standard portable electric drill.

It is Bridges' opinion that the field of portable electric tools, in particular, has not been sufficiently explored in this country in view of the need for increased production. The rapid expansion of his business in such a short while seems to prove his point. With his order book full beyond his capacity to meet demands, Bridges' only worry now is raw materials—and here he is certainly **not alone.**

The cutters in this pipe die are the largest component made by powder metallurgy in Britain

Efficient control of staff, never easily attained, is more than ever a problem when they are deployed on a variety of outside tasks. Yet it is in just these circumstances, if contracts are to be fulfilled and goods delivered on time, that efficient control becomes a "must." This is where V.H.F. radio emerges as a sound business proposition. For V.H.F. can provide up-to-the-minute contact between those who direct and those who seek direction.

Tighter Management

MOST people would agree that success in business depends on speed as much as anything. Quality is no longer the only criterion: you must deliver the goods in quantity and on time. Minds and bodies, machines and material must move quickly and surely, or the contract will not be renewed.

The demand for more of everything in less time and space has made its mark on the industrial organism, which has grown more complex and more "nervous." Factories and offices are covered with complicated networks of telephone wires, signal apparatus, amplifiers, vacuum tubes and conveyors. Cars, vans, trucks—even despatch riders—tear in and out of factory gates to the cry of "faster, faster."

Those of us who spend our time working our way round modern business organizations have come to accept these phenomena as part of the scheme of things. The new conveyor, the latest "intercom," are greeted with interest but without emotion. In this field only one recent development has shaken the industrialist from a mood of sophistication—the introduction of teleprinters to business communications systems.

By BRIAN CUMMINGS

And now there is another force to be considered among those affecting the speed of production. Radio. Normally one thinks of radio in terms of the B.B.C. news and signals at sea, but the fact is that impressive aerials are appearing in the most surprising places, including wholesale tobacconists, building and engineering contractors, mail order stores, laundries, taxi companies and municipal undertakings.

The type of radio used for this work is Very High Frequency Radio Telephony, or "V.H.F." The equipment is made by several well-known organizations, including Pye Ltd., of Cambridge, Marconi's wireless Telegraph Co., Ltd., and The General Electric Co., Ltd. The instruments include a fixed station transmitter-receiver and one or more transmitter-receivers for mobile equipment such as cars, vans, lorries, taxis, buses, railway engines, tugs, launches and ships.

V.H.F. radio employs ultra short waves which carry the voice over an average radius of 15 miles, and often much farther. Each set works on a single fixed frequency and there is no interference within one area.

The limited range prevents any interference between different areas, even though operators in Birmingham may be using the same frequencies as those in Manchester.

How three firms use V.H.F. for business purposes is described in the following case histories.

(1) *Scaffolding (Great Britain) Ltd.*, Mitcham, Surrey. This company's title explains their business, although they also supply general plant to the building and allied

Five Benefits of V.H.F. Radio

1. **Enables head office to contact outside staff without delay.**
2. **Provides regular progress reports on work in hand.**
3. **Permits maximum use of labour by directing it to the right place at the right time.**
4. **Cuts travelling time of supervisory staff.**
5. **Assists business expansion without increasing personnel.**

Where space or other considerations demand, the Pye fixed station can be remotely controlled by the compact "extension" unit illustrated above.

industries. Most people have seen their sign on scaffoldings erected around large and small building sites in industrial and commercial centres throughout Britain.

S.G.B., believing that speed is essential to good service, have installed Pye two-way radio in the cars used by their mobile staff (estimators, supervisors, etc.). The

Control — by V.H.F.

office and works are now able to speak to their outside staff at any time, thereby saving many hours' delay.

The system covers the London area and ranges as far as Barking and corresponding radii in other directions. Reception is loud and clear, but there is a certain amount of interference from traffic and screening by hills and buildings. To overcome this, S.G.B. are erecting in the Crystal Palace district a new aerial which will give greater range and efficiency.

The advantages of radio incorporated with telephone must be obvious, but the comments of Mr. C. E. Flay, manager of the company's tubular contracts department, who speaks from practical experience, are worth recording.

Says Mr. Flay: "Our equipment, which has been installed for more than two years, enables us to offer a quicker, better service, particularly as regards estimating and placing labour. This in turn has increased our business, given greater satisfaction to our customers, and enabled us to use our labour to the maximum.

"We consider the installation costs and servicing charges are fully justified from an all round point of view. In addition, experience has shown that radio telephony assists expansion without increasing personnel."

(2) *The Marconi International Marine Communication Co., Ltd.* This company not only supply V.H.F. radio but use it. Down at Southampton they have a service depot whose job it is to install and maintain radio equipment on board ship.

The work may take them into the radio room of one of the great liners or on board a small coasting vessel. Whichever it is, the job will be important and urgent. And V.H.F. helps them do it.

The story is not spectacular, but has a certain fascination because we are dealing with ships and the sea. And it is interesting because the *kind* of application is quite different from S.G.B.'s.

It comes to this. Marconi have an office with a transmitter-receiver for V.H.F. radio. Down below there is a van with similar equipment. The van carries men (engineers, and inspectors) and apparatus from ship to ship, and moves equipment, tools and spares from depot to docks. That is all—but it's quite enough.

When the van driver has completed deliveries, he gets his next job by radio. That saves times and petrol and is basic to V.H.F. But suppose he strikes a snag? There are a good many possibilities. Ships coming into port may be delayed by fog or heavy weather. Those in port may be moved without warning from one berth to another. Ships leaving port have to catch tides in order to keep to schedule. In short, *the jobs themselves are moving.*

During a test run the van stopped alongside the troopship *Empire Orwell* and the new liner *17th de Octobre,* so that the Marconi engineer could check existing equipment in the first ship and supervise the installation of new instruments in the second. Here another advantage of Very High Frequency Radio became apparent: it was possible to transfer the V.H.F. instruments from van to ship so that the engineer could remain "on call" to the depot whilst actually working on the normal equipment used in the ships concerned.

Earlier, the van called at the Old and New Docks, Ocean Quay, the

V.H.F.'s essential quality is immediate personal contact between headquarters and the mobile unit. Below (left), Mr. C. E. Tuck, Marconi manager at Southampton, is seen speaking from his office to (right) the driver of a van.

The Clifford cab (left), has just brought a passenger to the liner "Caronia." Now the driver is getting fresh orders from head office.

Below: The transmitter-receiver goes quite easily into the boot of a car.

King George V dry dock and the new Ocean Terminal, covering a radius of about five miles from the office. This demonstration showed that reception is generally loud and clear, despite considerable "screening" from warehouses and other dock buildings.

There are other applications of V.H.F. radio to port and harbour work. For example, instruments can be found on board the Harbour Master's launch, which maintains buoys and lights in Southampton water. The dredging of Southampton water is being directed by V.H.F. The Southampton Hydrographer uses "Walkie-Talkie (which is the simplest form of V.H.F. radio) to check the tide gauge indicating the navigable channel.

Any form of business operating mobile units would be well advised to employ V.H.F., in the opinion of Mr. Tuck, Marconi's manager at Southampton. Mr. Tuck uses his own company's equipment and saves 10 hours per week in travelling time

(3) *The Clifford Cab Company.* This company also work in Southampton, but are not equipped with Marconi radio; in fact they use another type of equipment altogether.

The pattern of the story is again much the same, except that it shows the *large number* of calls which can be handled in a short span of time by V.H.F. radio.

Clifford Cab, who run a 24-hour service, operate 26 cars, 12 of which are fitted with V.H.F. radio. The installation at headquarters is kept on all the time and deals with about 70 calls per hour. Maintenance costs 1/6d. per car per day, but the radio saves 6/- per car per day in telephone calls—to say nothing of additional economies in petrol and oil, wear and tear.

In the old days, a car did about 12 jobs per shift, or 24 per day. Now it does 18 per shift, or 36 per day. These figures mean big money to a cab company, and may account for the fact that taxi proprietors form the biggest group of V.H.F. users.

Mr. Peter Habin, of Clifford Cab, reckons that V.H.F. has increased the work capacity of his cars by one-third and earned tremendous goodwill among the public. Late one night a man 'phoned from a call box and asked for a car to take his wife to a nursing home. Fortunately a Clifford cab had just completed an assignment in the neighbourhood, and was directed to the new address. The man had scarcely left the box before the car was at the door of his home.

The installation at Clifford Cab cost just over £2,000, but here again the verdict is "We don't know how we would do without it."

So much for the case histories. One could go on, but the repetition would be pointless. The list of applications is growing every day, and ranges from the control of aircraft dropping fertilizer to vehicle demonstrations and the reading of gas meters. Police cars, fire engines and ambulances often carry V.H.F., whose modest aerial has even been seen waving triumphantly above the tailboard of a dustcart in Whitley Bay, Northumberland.

The manufacturers of Very High Frequency Radio Telephone equipment sometimes describe their products as the "Business Radio." A fair description, considering its versatility, neat appearance, and the advantages which it brings to the community.

The operator in this picture is working on a Pye medium power fixed station. It is yet another variety of V.H.F. equipment.

MEN OF VISION

SUCCESS—WITH SANDWICHES

LAST year a quarter-of-a-million sandwiches were dispatched from the romantic corner of London called Sherlock Mews, supposedly a favourite haunt of Sherlock Holmes, now the headquarters of the Tiffin Catering Co., Ltd.

The business—which has increased by 800 per cent—started three-and-a-half years ago, when 35-year-old Captain Myles Eadon of the Dorsetshires returned to civilian life and invested his £120 gratuity in setting up as a sandwich caterer. The idea came from Eadon's mother-in-law. Eadon is married to the step-daughter of Captain Ronald Bowes-Lyon (cousin to the Queen), who is also a director of the company. Mother and daughter began sandwich-making in the kitchen basement of their house in Gloucester Place, W.1. Then, they had only six customers, so Eadon bought an old shooting brake which he used to search out new clients as well as for deliveries.

CAPTAIN MYLES EADON,
Managing Director, Tiffin Catering Co., Ltd.

Does All His Business On The Telephone

Orders came in so fast that it was soon found necessary to take over the Mews premises. Here, four girls are kept busy filling sandwiches with a variety of good things; three telephones ring constantly (all business is done by 'phone), and three vans make daily deliveries in the greater London area. Speedy service is one of the secrets of Eadon's success; he makes certain that customers telephoning in the morning receive their sandwiches by lunch time.

Londoners seem to to be developing the snack habit, so popular in America. They are, however, still very conservative and refuse to be tempted by luscious Continental recipes. They stick to the old favourites—ham and tongue (when available!) and pressed beef—which cost one shilling per round. This price, incidentally, compares favourably with West End snack bars.

With business so brisk, the Tiffin Sandwich Co. have been able to buy out a competitor and enter the catering field, supplying banquets, re-unions, receptions, bridge parties, etc.

Eadon was joined recently by a boyhood friend, W. E. Harris, an ex-Colonel of the Royal Army Ordnance Corps. Harris is especially keen on developing the lunch box trade. He has also begun delivering hot soups, tea and coffee in vacuum flasks which he bought ex-War Department.

Tiffin have varied and unexpected customers. One woman has a standing order for one-and-a-half sandwiches to be pushed through her letter box every day; an anxious mother, worried about the food her son receives at his preparatory school, has ordered a parcel of sandwiches to be sent to him every Friday. Two bookmakers are regular clients. Actors like to have sandwiches while rehearsing.

A duchess likes to have a sandwich luncheon when she visits her hairdresser. The choir of St. James's Palace, the American Embassy, the Stock Exchange and the British Council are all clients.

For Eadon and his colleagues all this adds up to good, sound business. So much so that they are contemplating extending their activities. First on the list is Manchester.

(Men of Vision continues on next page)

MEN OF VISION

Continued from previous page

SELLS CAR HIRE TO DOLLAR TOURISTS

SELLING an idea is a lot more uncertain than selling something concrete, and when you propose to sell your idea in the U.S.A. and Canada, the proposition has more than a small element of risk. Leslie Wilson was well aware of this when he went to Canada in 1949 to persuade potential tourists that the right way to see Britain was to hire a car—and, of course, to hire it from him. With Wilson went three great assets—a good working knowledge of the average American and Canadian, a firm belief that the countryside of Britain is as beautiful as any in the world and an unbounding enthusiasm and zest for life.

Self-drive car hire (or, as it is known in the U.S, car rental) is not new to Wilson. His father started the business in 1904 and self-drive car hire was inaugurated in 1922. Leslie Wilson joined the firm as soon as he left school and in 1936 became managing director.

At the end of the war he thought—quite rightly—that many Americans and Canadians would want to come to Britain, but he realised that to "put over" car hire to them needed the personal touch. There was a psychological value in shaking hands with your potential customer which no amount of advertising could obtain. Self-drive car hire is, as Wilson says, a personal type of business.

In 1949, he had a stand at the Canadian National Exhibition. He took with him 9,000 leaflets, showing the exact rates for drive-yourself and chauffeur-driven cars in dollars and cents. (U.S. and Canadian), and spent £45 in excess luggage charges for them rather than take a single spare suit or even a toothbrush. These items, he decided, could always be bought on arrival. But the 9,000 leaflets proved to be an underestimate and after a few days at the Exhibition more had to be ordered from Canadian printers. In the end he distributed 24,000 pieces of literature. The exhibition was in August —the end of the season—but Wilson did not have to wait until the following summer to recover his costs. During the winter enough customers materialized to cover two-thirds of them.

One of the first things he did at the exhibition was to take down his "Car Hire" sign, which merely puzzled Canadians, and replace it with the more familiar transatlantic term "Car Rental." People of all types and ages made personal enquiries and took away literature; more than 2,000 gave their names and addresses as possible visitors to Britain.

Last year, Leslie Wilson concentrated his personal approach on the U.S.A. and exhibited at the British Motor Show in New York in April. The Americans' lively interest, plus the extra experience he had gained in the previous 12 months, made this trip even more successful. He disposed of some 28,000 leaflets.

The Personal Touch

"Our organization is more than an impersonal car hire service," he says. "We're practically a travel agency-cum-transport service. We map out special tours, suggested routes, names of suitable hotels—everything an intending traveller can wish to know, whether he's going to the Pennines or the Pyrenees."

Wilson has published a book "Highways of Britain" which sells for $1.00 and is based on his personal knowledge. As far as travelling in Europe by car is concerned, Wilson has had plenty of experience, for during the past few years he has covered over 100,000 miles, getting first-hand information. With him on these trips go his wife and family, and he takes a careful note of their reactions. Since many women hire his cars, his wife's ideas are invaluable.

Another point in his "personal touch" programme is that when he is at his Acre Lane, London, office

LESLIE WILSON,
Managing Director, Wilson's Car Hire Services Ltd.

he insists that all enquirers from overseas should be brought to him, so that he may welcome them and hear their views on his service. "The value of such people's recommendations to friends when they arrive home is not to be overlooked," he says How right he is can be proved by the fact that in 1948 the turnover of the car hire side of the business was eight times as much as 1938, and since 1947 has increased by 300 per cent. Overseas business in 1950 was 25 per cent. up on 1949, which indicates pretty clearly that Leslie (Come to Britain) Wilson, as he is known, has the right idea when it comes to hiring cars.

This year, with the Festival of Britain, he expects to be busier than ever and already has many bookings throughout the year. The problem will be not to get customers but to get cars. At present he has a fleet of 60, all modern, and ranging from Morris Minors to Humber Pullmans; but this is nowhere near enough, and he could do with 300. He gets priority for new cars, but not sufficient, and this is one subject that damps Wilson's enthusiasm because, as he points out, one car on hire repeatedly earns its value in hard currency, not only for his firm, but for many other industries.

Using Punched Cards to Record Insurance Contributions

By H. J. COAST, A.C.I.S.

Sales Accountant, British Celanese Limited.

Punched cards have enabled British Celanese Limited to derive the utmost benefit from the new system of paying insurance contributions in bulk.

BY using punched cards to operate the new system whereby insurance contributions can be paid in bulk, British Celanese Limited are achieving valuable economies in time and labour, while the elimination of nearly all stamps has obviated the need for elaborate security measures.

Payment for contributions by schedule is officially approved by the Ministry of National Insurance. The system, which was fully explained in the November issue of BUSINESS, is an alternative to the fixing of stamps to cards weekly, using stamps of higher value representing more than one week's contribution, or using automatic franking machines. Any firm with at least 1,000 regular employees may apply to their local M.N.I. office for permission to pay contributions in bulk.

Since British Celanese Limited employ several thousand people at their Spondon works, the stamping of individual insurance cards presented a considerable problem. The high total value of the contribution stamps necessitated elaborate security measures, and the Ministry's method of payment by schedule was, therefore, welcomed.

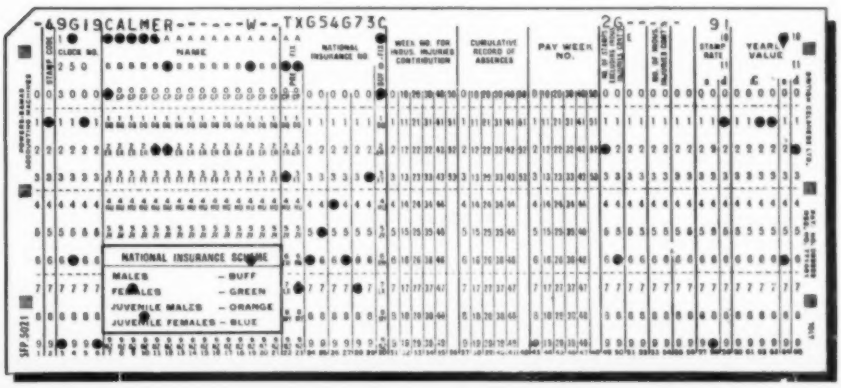
As in most large organizations using punched card equipment, the firm's payroll is compiled on cards which record each employee's identification number and name. In adopting the new method of paying contributions, means were sought to utilize the information already available on the payroll card. There were two angles of approach to the problem: either attendance at work (with liability to stamp) or absences (no liability to stamp) could be recorded. Since the payroll already showed both employer's and employee's contributions British Celanese Limited decided to account only for absences or other variations from normal. They were thus able to maintain the necessary record without taking weekly action for employees who were liable for their normal weekly contribution.

A card, as illustrated, was designed to record the following:

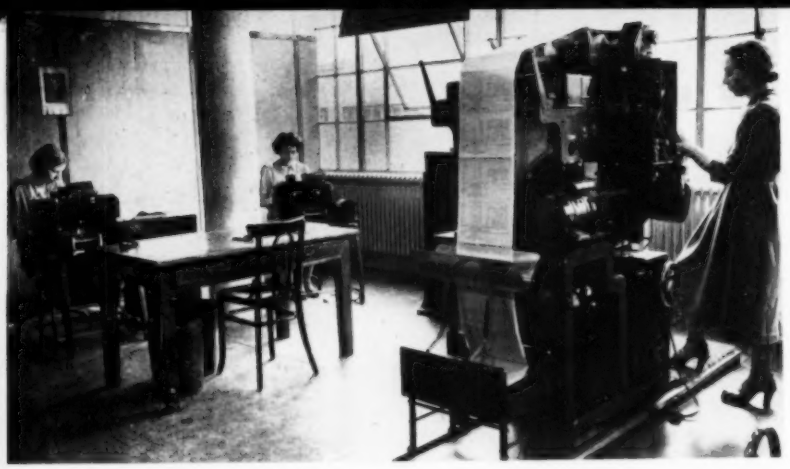
(1) *Code symbol.* This was fixed for each type of stamp. The information was punched to represent the various denominations of stamps and permit rapid sorting of cards into stamp groups for ultimate valuation and recording on the schedule

(2) *Clock (identification) number and name.* These were inserted in the cards by reproduction of similar detail from the payroll card.

(3) *National Insurance number.* This, punched directly from the insurance contribution cards and the number fixed by the Ministry, has a suffix indicating the insurance



An example of one of the National Health Insurance Cards as used by British Celanese Limited.



Part of the punched card installation showing a tabulator equipped with a summary card punch.

year, *i.e.*, A, B, C, or D, which was also punched into the card.

(4) *Week number for Industrial Injuries Contributions.* These columns are used to indicate any week during which an employee, by virtue of working not more than two hours, is not liable for the normal contribution but is called upon to pay the Industrial Injuries element only.

(5) *Pay Week Number.* These numbers relate to the calendar year, starting in January and finishing in December; they are the relative payroll week number and bear no relation to the various national insurance year commencing dates.

Before the scheme was introduced it was necessary to prepunch one of the above detail cards for every employee. At this stage only the following columns were completed: stamp code, clock number, name, National Insurance number and stamp rate. After interpreting and sorting to clock number order, the cards were tabulated to produce a control total of contributions normally payable per department. The cards were then filed in groups according to department.

The normal weekly procedure is to extract from the file those cards in respect of absentees and employees liable to Industrial Injuries contribution only. The relative pay week number is first punched in the appropriate columns. The cards are then sorted to group together those with a similar number of absences to date, and the applicable cumulative number of absences is punched into each group.

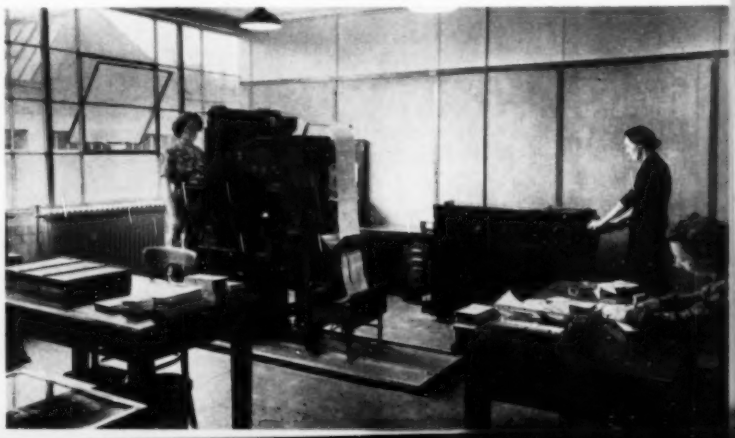
The correctness of these operations is easily checked as there must be the same number of holes punched into weekly absences and absences to date columns The cards are next tabulated to provide a list from which the appropriate week on the National Insurance stamp card can be marked "O," symbolising non-contribution. Absentee cards are returned to the file; the remainder are punched with the relative week number in the Industrial Injuries contribution column, after which they are tabulated for record and then also returned to the file.

When new workers are employed, an insurance contribution card is prepared showing all the detail previously mentioned, but as the previous employer has been responsible for recording contributions to date it is necessary to record this fact in the card. This is accomplished by treating the employee as being absent for the appropriate number of weeks for the relative National Insurance year preceding the new engagement. The cards are, therefore, punched accordingly, recorded for control purposes and placed in the file.

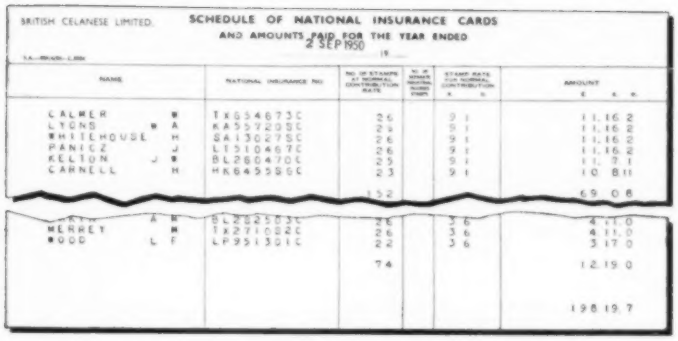
Cards of employees ending their employment are extracted from the file, tabulated for record purposes and passed to the cashier's department. Here the National Insurance stamp cards are stamped to date in accordance with the punched information, and the detail cards are retained by the cashier. At the end of the National Insurance year, the total contributions due in respect of employees leaving are deducted from the total stamp value appearing in the payroll.

The two remaining variations are departmental transfers and change of contribution rate. In the case of transfers between departments, these are recorded as they affect the departmental control total. Consequently all relevant detail cards are extracted, tabulated for record purposes and re-filed within the appropriate new department.

When a change in the contribution rate is necessary, the detail card relating to the old rate is ex-



Another view of the installation with a sorter in the background (right).



BRITISH CELANESE LIMITED.

SCHEDULE OF NATIONAL INSURANCE CARDS
AND AMOUNTS PAID FOR THE YEAR ENDED
2 SEP 1950 19

NAME	NATIONAL INSURANCE NO.	NO. OF STAMPS AT NORMAL CONTRIBUTION RATE	NO. OF STAMPS NATIONAL SCHEME CHARGE	STAMP RATE FOR NORMAL CONTRIBUTION s. d.	AMOUNT £ s. d.
CALMER W	TX654673C	26		9 1	11.16.2
LYONS W A	KA557209C	26		9 1	11.16.2
WHITEHOUSE H	GA130275C	26		9 1	11.16.2
PANICZ J	LT510467C	26		9 1	11.16.2
KELTON J W	BL260470C	25		9 1	11.7.1
CARNELL H	HK645556C	23		9 1	10.8.11
		152			69.0.8
[illegible] A W	BL282583C	26		3 6	4.11.0
MERRET W	TX271082C	26		3 6	4.11.0
WOOD L F	LP951301C	22		3 6	3.17.0
		74			12.19.0
					198.19.7

Part of one of the Ministry of National Insurance schedules.

tracted from the file; then the clock number, name and insurance number are reproduced for the new card. The revised stamp code and stamp rate are also punched into the new card and all preceding weeks of the appropriate insurance year are punched as absences.

New cards are interpreted, tabulated for record purposes and inserted into the appropriate departmental file. The old detail cards have all subsequent weeks of the corresponding insurance year punched as absences. The old cards are then tabulated for record purposes and after sorting into correct insurance year groups are filed in special suspense files until the end of the relative insurance year.

The formula for the weekly departmental reconciliation is drawn up as follows:

Control total
Plus new employees
Plus transfers in
Plus new rates of contribution
Less resigned and dismissed employees
Less transfers out
Less old rate of contribution
Less absences, etc.
Total National Insurances recorded for payroll

Quarterly, as an insurance year ends, corresponding cards are withdrawn from the file by sorting on the suffix portion of the National Insurance number. From these cards, new ones are first reproduced for the next year. The old cards are then associated with the change of rate cards, previously mentioned as having been placed in a special suspense file. They are then sorted into similar stamp groups.

Each stamp group is sorted into packs of cards of the same number of cumulative absences. The next operation is the evaluation of the cards by applying to them a predetermined extension for the appropriate number of possible attendances within each stamp group. The individual cards are punched by passing them through a reproducing punch in association with the master card, which has punched in it a predetermined valuation.

After the master cards have been outsorted, the detail cards are tabulated in descending stamp value to produce the Ministry of National Insurance schedule. To obtain a bulk reconciliation, the detail cards in respect of the other three unexpired National Insurance years are sorted into similar number of absences within common stamp values, and master cards are inserted as necessary. A tabulation recording the number of detail cards relative to each master card enables a total figure to be calculated; each represents the value of stamps due to date for all employees whose insurance year has not expired. This total figure, added to the total recorded on the schedule, less the amount used on direct purchase of stamps for ex-employees, balances to the National Insurance contributions to date as recorded on the payroll.

The system has been in operation for over six months and has saved much time and labour. Just as advantageous has been the elimination of handling of nearly all insurance stamps. Previously, special security measures were essential, as the yearly value of stamps ran into six figures, but to-day no insurance stamps are handled except in the case of employees leaving the firm's employment.

Another advantage has been the solution of the problem on the basis of what might be termed "eliminating the positives and looking after the negatives." In other words, there is no weekly record of normal contributions, all operations being restricted to absentees, etc., comprising approximately five per cent. of the total payroll.

A final point in favour of the new system is that the staff of the department find their work more interesting than before. They know the cards are in balance every week, and are able to despatch the requisite schedules to the Ministry without trouble or extra effort.

A section of the pre-punched card file at the Spondon offices.

Costing Helps a Process Industry

By JOHN MANOLESCUE

In his final article, the author outlines the methods by which the results obtained from a system of standard costs should be presented to management.

ENTRIES to all ledgers are made from posting summaries, *i.e.*, classified syntheses of all costing and financial transactions. The function of the journal is restricted to the correction of errors and the recording of non-recurring items. Routine transfers are picked up from the posting summaries; they are *not* journalized.

Following is a list of the posting summaries:

(1) Brewery cost sheets.
(2) Bottling cost sheets.
(3) Inter-brewery raw material transfers **(at standard prices.)**
(4) Bottle breakages.
(5) Periodic charges.
(6) Outstanding suppliers.
(7) Depreciation.
(8) Service transfers.
(9) Inter-depot material transfers **(at standard prices.)**
(10) Holiday pay.
(11) Home and export sales.
(12) Cost of sales.
(13) Sales credit notes.
(14) Sales transfer journal.
(15) Purchases.
(16) Gifts and samples.
(17) Wages posting summary.
(18) Bank payments.
(19) Bank receipts.
(20) Petty cash.
(21) Opening and closing entries.

The Monthly Accounts

The costing records, *i.e.*, the production ledger and the expense ledger, provide the data for the presentation of the monthly accounts. Both ledgers are designed to give the required information speedily; prior to ruling off the accounts, all variances are transferred monthly to a variance summary account which is then taken to the trading account. There are eight schedules in use, and their function is to enable management to ascertain, among other things, the following points:

(a) whether or not the manufacture of certain products is economic, and if not why;

(b) whether or not the plant is used at maximum capacity, and if not why;

(c) whether the desired volume of output has been achieved at the anticipated cost;

(d) whether waste and inefficiency has been successfully eliminated or at least reduced, compared with previous periods;

(e) whether or not a change in prices is desirable;

(f) whether selling prices secure a sufficient margin of profit to warrant expansion;

(g) whether methods, designs, equipment, etc., require overhaul.

The monthly accounts consist of a balance sheet and a trading account; the latter is supplemented by six auxiliary schedules.

The balance sheet is a statement prepared from the production, expense and nominal ledgers showing the remaining debit and credit balances after the preparation of the trading account. It is, in effect, a classified summary showing the nature and value of assets and liabilities.

The trading account is compiled for the purpose of ascertaining the

MONTHLY TRADING ACCOUNT

		£	£	£
	SALES (from regional sales reports —actual values)			....
Details on sales analysis statement	less COST OF SALES (from cost of sales summaries, i.e. units sold multiplied by their standard cost)			....
Details on standard profit statement	BREWERY STANDARD PROFIT			....
	add or deduct : PRODUCTION VARIANCES			
	material price	....		
	material usage	....		
	breakage	....		
	efficiency	....	....	
	(extracted from the variance summary account in the production ledger).			
Details on labour and overhead variance analysis	LABOUR & EXPENSE VARIANCES			
	expenditure	....		
	volume	....	....	....
	(extracted from the variance summary account in the expense ledger).			
	ACTUAL GROSS PROFIT			....
Details on Schedule 6	less ADMINISTRATION EXPENSES		....	
Details on Schedule 7	SELLING EXPENSES		....	
Details on Schedule 8	DISTRIBUTION EXPENSES		....	....
	NET TRADING, PROFIT/LOSS			....
	add INVESTMENT INCOME		....	....
	MISCELLANEOUS INCOME		....	....
	less " EXPENSES		....	....
	NET PROFIT/LOSS BEFORE TAXATION			

All figures in light type denote losses. **Schedule 2. SALES ANALYSIS STATEMENT.** Period 6 (5 weeks ending June 30,1950)

Products or Area	BUDGET SALES		Quantity actually produced	ACTUAL SALES		Total Variance	VARIANCE ANALYSIS			
	Quantity	Amount		Quantity	Amount		Volume (lack of orders)	Volume (lack of stocks)	Mix	Price
	Barrels Doz.	£		Barrels Doz.	£	£	£	£	£	£
Cask Beer (£30 per barrel)	5,618	168,540	5,000	3,000	90,000	−78,540	−76,686	−1,854	—	—
Bottled Beers Brown Ale (10/- doz.) Pale Ale (12/- doz.) Light Ale (8/- doz.)	125,000	62,500	100,000	100,000	52,000	−10,500	—	−12,500	+2,000	
		£231,040			£142,000	−£89,040	−£76,686	−£14,354	+£2,000	

gross profit. Its lay-out differs from the orthodox trading account inasmuch as commencing stocks, trading expenses, purchases and closing stocks are replaced by one single composite figure, *i.e.*, the cost of sales. The latter represents the value of stocks (at standard cost) sold during the period. The difference between sales and cost of sales constitutes the gross standard profit, which must then be adjusted to give the actual gross profit. The trading account is further augmented by six subsidiary schedules which show each operating aspect of the business in detail:

(1) Sales analysis statement.
(2) Standard profit statement.
(3) Labour and overhead variance analysis.
(4) Administration expense summary.
(5) Selling expense summary.
(6) Distribution expense summary.
(7) Marginal profit analysis.

The monthly accounts should also be supplemented by statistical tabulations supplying information in regard to regional sales by products, areas, travellers, types of customers, etc.

The sales analysis statement is a classified summary of the sales achieved during the period. It may take several forms; classification by products (home and export); by areas, markets, agents or travellers; type of customers; periods (months, weeks, etc.). Classification by products can be obtained quite readily from the production ledger; regional sales can be extracted from branch or agents' sales reports. Sales, cost of sales and standard profit for each product are combined in one account with all debits in black and credits in red.

The standard profit only will be taken into the monthly trial balance of the production ledger. The quantities corresponding to sales values can be obtained from the regional sales summaries. All budget figures can be extracted from the master budget which is prepared at the beginning of the year to conform to the above pattern. The sales analysis statement reveals differences between anticipated and actual sales. These are then analysed into three main causes: (1) losses or gains resulting from actual sales being below or above budget (volume variance); (2) losses or gains due to deviations from the budgeted ratio of quantities to be sold at varying prices ("mix" variance); (3) losses or gains resulting from price changes during the period.

Continued on page 88

All figures in light type denote losses **Schedule 3. STANDARD PROFITS ANALYSIS STATEMENT (BOTTLED BEERS)** Period 6 (5 weeks ending June 30, 1950)

Products or Area	BUDGET PROFIT		Quantity actually produced	ACTUAL PROFIT		TOTAL Variance	VARIANCE ANALYSIS			
	Quantity	Amount		Quantity	Amount		Volume (lack of orders)	Volume (lack of stocks)	Mix	Price
	Doz.	£		Doz.	£	£	£	£	£	£
Kent	2,066	181		1,216	105	−76		−80	−2	+6
Surrey	3,099	310		2,599	244	−66		−50	−16	—
Middlesex	700	89		399	45	−44		−39	−5	—
Essex	332	36	100,000	388	41	+5		+6	−1	—
Hampshire	2,066	767		1,928	606	−161		−51	−110	—
London	116,736	10,420		93,470	8,959	−1,461		−2,077	+616	—
	125,000	11,803	100,000	100,000	10,000	−1,803		−2,291	+482	+6

NEW for your OFFICE

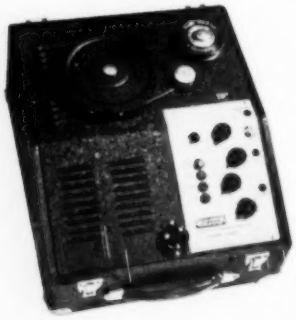
Multi-Feature Recorder

SPECIAL features of a new long-playing magnetic recorder-reproducer make it of interest to executives already familiar with recording equipment, as well as to those who are deliberating a first purchase.

The 29-lb. *Filson* is a combined dictating machine and conference recorder which has been designed in the light of considerable user research. It uses a new type of magnetic wire (.0036in. diameter), which is tough and will not break under normal usage. The problem of threading does not arise due to the simple but ingenious mechanism. The clarity and fidelity of reproduction are of a high standard.

An outstanding feature is the machine's mechanical silencer, and special attention has been paid to the elimination of motor hum. The *Filson* will play for over 60 minutes, although 30 and 15 minute spools are also provided. For rewinding at speed to any particular word—often necessary for checking facts in detailed letters—a word locator is provided. Erasure can be effected on fast re-wind, and with each fresh recording.

A unique accessory is the four-way control pedal, which ensures accurate stop-start, forward and fast rewind movements and repeater (back-spacing) action, and can be operated at any distance from the machine.



The Filson combined dictating machine and conference recorder

One of the Luxorlite diffused lighting units

The *Filson* is specially suitable for centralized installation, if desired, by virtue of the considerable distances from which both the microphones and transcription controls can be operated from the machine. The input sockets provided can be used for headphone reception, monitoring, microphone and an extension speaker. Either a crystal type microphone—about the size of a pocket watch—or a dynamic model is available. The latter is a new design having a pen-size extension and detachable base. The base can be used for close speaking in busy general offices without picking up extraneous noises.

For recording telephone conversations without actual connections to the telephone instrument, a pick-up unit can be provided. This mechanism is in the form of a pad on which the telephone stands. Other additional equipment includes the *Lector*, a magnetic playback unit (12in. by 8in. by 6in.) for use by a secretary or typing pool. This unit incorporates a built-in speaker with automatic cut-out and is jacked for both headphone reception and control pedal.

—(*Enquiry Ref. No. O.2/11.*)

Diffused and Different

ALTHOUGH diffused lighting devices are no new discovery, the *Luxorlite* light diffusing system has an added attraction. In an attempt to overcome many of the problems presented by the use of sheet metal light source screens, designers of this device have developed a special translucent plastic material screen which absorbs less than 5 per cent. of the light as contrasted to 20 per cent. absorption with the other type of material.

Tiny facets on the screen also amplify and refract the light, distributing it brilliantly and evenly over the entire surface. Used as a screen for cold cathode type fluorescent lighting units, the *Luxorlite* is adaptable to any convenient size and is available in suspended, ceiling (flush), or recessed units.

In offices, board rooms and premises where intensity control is desired according to external light conditions—a light control system can be obtained. This easily-operated lighting panel allows regulation of intensity stages between 25 and 100 per cent. Colour or density of light can vary according to the selection of tube units installed and ranges from warm white, natural white and intermediate white, to gold.

—(*Enquiry Ref. No. O.2/12.*)

Italian Calculator

ALTHOUGH the *Everest* calculator may be new to the British market, the Italian manufacturers have had 30 years' experience in making office machines. The present model—the *Z4*—is manually operated entirely by the right hand. It is key set, and as the keys are depressed the corresponding figures appear in the visibility register on the left of the machine.

The *Z4* has a capacity of 8 x 10 x 13—sufficient for the average office. Various locks are incorporated to prevent mistakes being made once a problem has been started on and this allows a relatively unskilled operator to use the machine with safety.

Unlike the standard type of cal-

HOW DO YOU HANDLE YOUR FIGURES?

Every business depends largely on accurate figures, available immediately, when, and as, they are wanted. Old methods, laborious, wasteful, and often inaccurate, cannot be tolerated to-day. Modern business, using **Bulmer's Calculators** and **Systems**, is successful business, economising in time, labour and money. Thousands of commercial firms and organisations, large and small, throughout the British Isles, also government departments, have our equipment in constant use producing vital figures.

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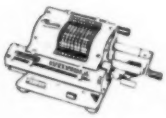
All electric, will handle every calculating need. Completely automatic. If you must have the best—buy FRIDEN.

THE ADDO

Adding and Listing Machines Electrically or Hand Operated—the best help for general office work.



THE MULTO

Handy, portable, lightweight calculator. Adds, subtracts, divides and multiplies. Takes up no more room than a desk telephone.

Consult

MODERN CALCULATING MACHINES & SYSTEMS

BULMER'S

BULMER'S (CALCULATORS) LTD., 7-8 POULTRY, LONDON, E.C.2.

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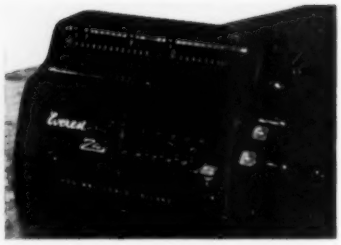


The neat arrangement of dials and keys are emphasized in this photograph of the Everest calculator

culating machine, the whole action is enclosed, the carriage moving within the limit of the enclosed sides. This has the advantage of keeping the mechanism free from dust and damp.

Addition, subtraction, multiplication and division can all, of course, be carried out. Division is performed by pressing the division key and transferring the figures to the left of the machine, working to the right.

The *Everest* is silent in operation and very portable, weighing only 15lb. and is available in Britain.

—(*Enquiry Ref. No. O.2/7.*)

The Addresserette

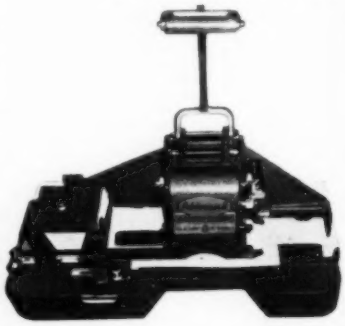
TO help fill a considerable demand for a small, low priced hand-operated addressing machine, designers of the *Addresserette* have produced a versatile silent unit suitable for the requirements of the smaller business or the departmental addressing job.

Simple to operate and using a regular size silk stencil, this new piece of office equipment prints face up, features complete visibility and will duplicate, skip or repeat, as required. To businesses which have only a small amount of repetition addressing, or those whose billing or invoicing entails printing the one address on several different forms, the *Addresserette* wlll be of particular interest.

Up to 45 stencils at one time may be kept in the left hand hopper and these can be passed under the printing roller by pushing a small knob horizontally. Visible at the printing point, stencils can be selected and skipped through, remaining in the correct order throughout. Actual prints are made by pressing down the operating handle which brings the soft rubber printing roller into contact with the silk stencil, squeezing ink through the typewritten surface.

Two gauges are supplied. These can be adjusted to take small pay-packet size envelopes and labels, or larger material of up to 12 in. by 10 in. Speed of the machine is about 600 addresses per hour, but with a special reel attachment labels can be printed from a roll of gummed paper, printed and perforated, at a speed of approximately 1,500 per hour.

—(*Enquiry Ref. No. O.2/10.*)



The Addresserette answers the demand for a small, low priced addressing machine

NATIONAL INSURANCE STAMPS

—*an unnecessary business risk*

At peak periods the value of national insurance stamps held by a company of say a hundred employees can be as high as £1,000. The continuous risk of loss, misuse and forgery is very real as you can see from the many cases reported in the daily press almost every week. The correct solution is to dispense with stamps altogether by installing a Neopost Insurance Machine, approved by the Ministry of National Insurance. Quite apart from the elimination of unnecessary risk, Neopost saves a great deal of staff time as well. Send coupon for full particulars.

neopost

FRANKING MACHINES

Please send me full information about Neopost National Insurance Machines.

NAME .....

ADDRESS .....

RONEO-NEOPOST Ltd., Victoria House, Southampton Row, London, W.C.1

Telephone: HOLborn 4933. Telegrams: Romosafe, Westcent, London

TBW 4

BUSINESS RADIO

for men who mean Business

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Complete Radio-Telephone installation for use in vehicles TYPE PTC 112/113.

The Pye Radio Telephone, has been designed to assist in the administration and control of transport services. Let us send you full details of the way it can help you in your business.

Telecommunications

are you really managing without it?

PYE TELECOMMUNICATIONS LIMITED
DITTON WORKS, CAMBRIDGE, ENGLAND

High Speed Collator

A NEW American suction-feed, eight-page collating machine, which boasts a gathering speed of five to eight times that of a skilled gathering specialist, will be available in Britain very shortly.

Gathering jobs, which may include sheets of from 5 by 8½ ins. to 9½ by 12 ins. in size, and may be as thin as flat onionskin (9 lb.) or as thick as ⅛-inch cardboard, can be done at speeds up to 4,000 sets or 32,000 sheets per hour. Built on the conveyor principle, with eight separate hoppers or "stations," the machine can be geared to run at a minimum slow speed of 700 sets per hour. Any number of sheets from two to eight can be gathered.

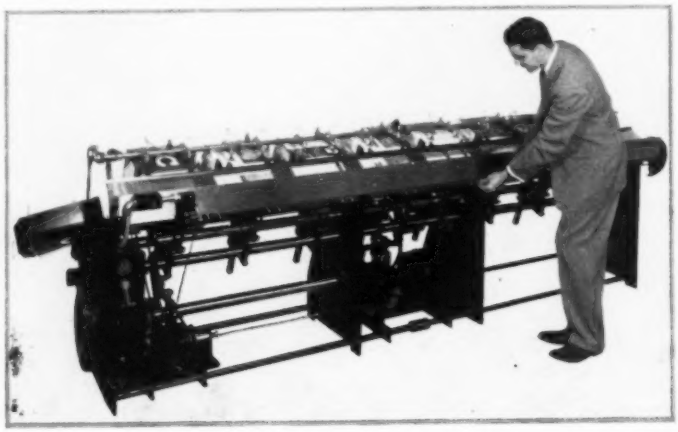
Each station can be turned off completely if necessary, or regulated for the desirable suction feed or blower-separator pressure. The latter device—a special feature—separates one sheet of paper from the next by a blast of air, thus helping to avoid misfeeds.

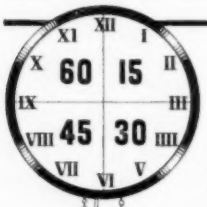
An automatic detector, incorporated as a special precaution, checks each completed set and, when an error is noted, a sensitive gauge stops the machine.

Eleven-and-a-half inches of paper (or 3,000 sheets of 20-lb. stock) can be accommodated in each station, allowing one hour of running at normal speeds without reloading. If one pile, containing a heavier stock, diminishes more rapidly than the others it can be reloaded in a few seconds by stopping the machine—but without disturbing the remaining stations. Tops of piles are kept at the right height for each separate station by automatic raising mechanisms.

Overall machine specifications are: length, 12ft. 3in.; width, 2ft. 9in.; height, 3ft. 5in.; weight (estimated), 1,500 lb.

—(*Enquiry Ref. No. O.2/9.*)





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We refer to recording time, of course—it is such a vital consideration. Some machines offer as little as three minutes—adequate in certain circumstances, perhaps. Other machines provide for six minutes—

★ **BUT** that important telephone conversation lasted ten minutes—that vital specification took, to dictate, 40 minutes—and the Directors' meeting continued for over 60 minutes.

So really the User should be the Arbiter of just how long he requires to enjoy continuous Dictation and Recording to meet EACH and EVERY circumstance.

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THE LONG-PLAYING PORTABLE, MAGNETIC RECORDER-REPRODUCER.

PROVIDES FOR 15-30 OR OVER 60 MINUTES CONTINUOUS TROUBLE-FREE DICTATION.

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Give your desk its own modern fluorescent lighting. SOLITE is indeed a handsome unit, that conveys a quiet air of modernity which denotes intelligent lighting care and selection. The shadowless glow eliminates eyestrain so often associated with single point lighting. Fitted with radio interference suppressor.

Supplied in colours Black, Burgundy, Olive Green or Cream.

Crackle finish with Chrome supports.

A.C. mains 200/20 or 230/50 Volts.

MOUNTSUN LTD. *WEST MALL WORKS, RABBIT ROW, W.8.*
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M.B.E. Awarded to Mrs. Elliott

TWENTY-SEVEN years' service to the Office Appliance Trades Association was recognized in the New Year's Honours List by the award of the M.B.E. to Mrs. S. S. Elliott, the Association's exhibition director and acting secretary.

Mrs. Elliott was responsible for staging the Business Efficiency Exhibitions at Olympia in 1949 and at Manchester last year. Now she is planning the 1951 O.A.T.A. Festival Exhibition.

She has also been responsible for ensuring the presentation of the industry's products at the B.I.F. each year.

★

PROMINENT guests at the annual Christmas luncheon of the London Branch of the Typewriter (and Allied) Trades Federation included Mr. W. B. Woods, President of the O.A.T.A., and Mr. W. E. Sculthorp, President of the National Association of Distributors of Office Equipment.

Mrs. S. S. Elliott, M.B.E.

The luncheon—at which there was a record attendance of 215 branch members and guests—was presided over by Mr. R. R. Smith, chairman of the London Branch. Mr. W. Lorraine Haig, President of the Federation, was also present.

BALLOTING for space at the 1951 Business Efficiency Exhibition at Olympia took place recently at Frascati's, when 120 heads of the office equipment industry attended a luncheon organized by the Office Appliance Trades Association. Members of the exhibition committee afterwards visited Olympia to examine dummy designs of a number of stands.

Total stand area at the exhibition will be 175,000 sq. ft., making it the largest of its kind ever staged.

★

EXTENSIONS costing £45,000 are to be made to the Tottenham works of the Kolok Manufacturing Co., Ltd., announced Mr. E. S. Dumont, the chairman, at the company's 42nd annual general meeting. This move has been rendered necessary by increasing demands for the firm's carbon paper and typewriter ribbons.

Continued on page 74

The Times of yesterday is as accessible as THE TIMES of today in microfilm facsimile

Every issue of 'The Times' from 1785 has been photographed on 'Kodak' 35 mm. microfilm. These permanent film records take up only a fraction of the space required by the originals and they are much more conveniently and easily handled (a single tiny reel contains as much matter as a bulky bound volume).

In addition, these compact film records greatly simplify reference work. The film reel covering any period is quickly found and slipped into the film holder of a 'Kodak' Library Reader. The film is projected, clearly and distinctly, on to a self-contained screen. You "turn the pages" simply by revolving a knob on the side of the viewer. A few seconds will probably be sufficient to find the reference you want.

'The Times' in microfilm facsimile is available either as a complete record or in sections—each section containing a block of years or an individual year.

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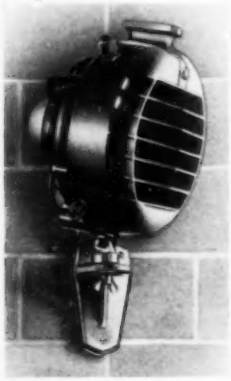
FAN HEATING UNIT

★ for Steam operation



The New Steam
"SPIRALUXE" HEATING UNIT

. . . . . provides comfortable warmth *rapidly*, and is ideal for offices, board rooms, canteens, etc. Motor driven fan ensures even heating throughout the room and eliminates cold spots. Fitted with built-in-switch. Smartly designed and sturdily constructed. The SPIRALUXE can now be supplied for operation through own steam supply, thus reducing electricity load. Electrical models 2kw & 3kw. in portable or wall-mounted types. Write for Leaflet No. B 93.

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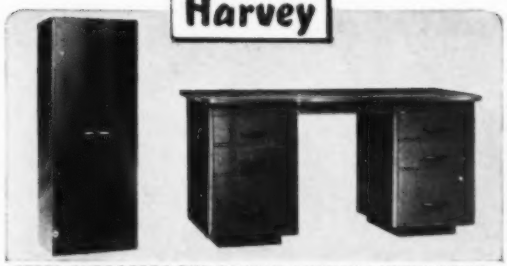
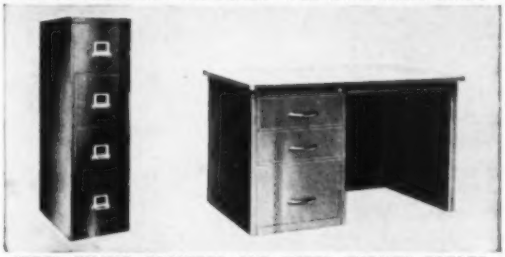


STEEL CUPBOARDS AND DOUBLE PEDESTAL STEEL DESKS.



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Continued from page 72

THE National Census of Population on April 8 will be the fifteenth to be held. The first was in 1801, and the sequence has been continued at ten-year intervals ever since, except for a break in 1941.

Present - day administrative needs, however, demand more comprehensive information than has previously sufficed, so that the latest developments in punched card equipment are likely to undergo a stern test.

The contract for the installation of machinery has been placed with Powers-Samas. Equipment used will include the new universal printing counting sorter, which simultaneously counts up to 36 separate positions of a hole in a 65-column card and automatically prints the sub-totals. Four hundred cards a minute can be passed through this machine without stoppage.

The installations will be used for counting the number of people in each area in the country and classifying them by sex, age and marital status; for computing the number of households of specific sizes, and the composition within these areas, and for determining the nationality and occupation of every member.

★

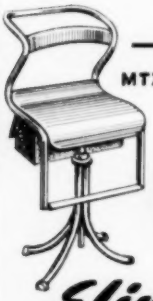
THE vital importance of office machinery in an all-out military effort is now, apparently, being realized on both sides of the Iron Curtain. Mr. Ray R. Eppert, Vice-President of the Burroughs Adding Machine Company and President of the American Office Equipment Manufacturers' Institute, recently revealed that the office machine industry in Eastern Germany was scheduled to produce as much in 1950 as in 1936. A five-year plan was also under way to increase output by 3/400 per cent. by 1955.

★

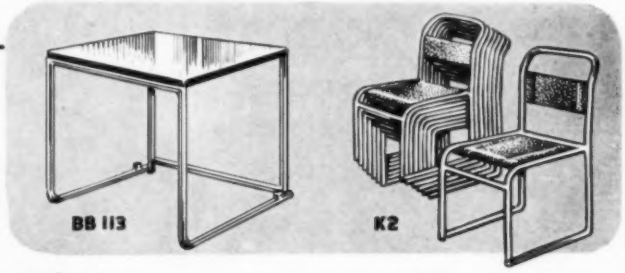
DEFENCE programmes will focus attention on the manpower-saving advantages of office equipment, according to Mr. Philip V. Summer, chairman of Dictograph Telephones Ltd., addressing the company's 14th annual general meeting. Ensuing months should thus prove successful for the company. Orders in 1949 exceeded those for 1948, said Mr. Summer, while those for 1950 were expected to be even greater—orders received since September had exceeded all expectations.

★

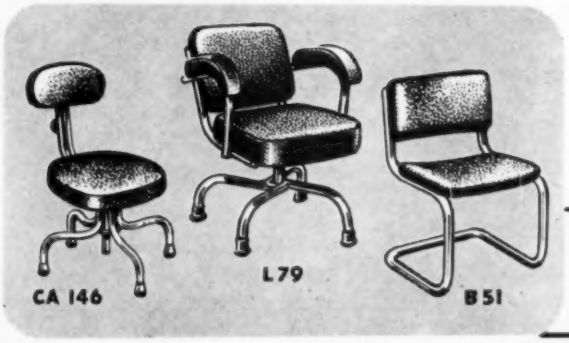
ON page 156 of the September issue of BUSINESS, it was stated that Milners Safe Co., Ltd., have "concentrated mainly on high quality steel equipment, but they have introduced a safe filing cabinet." Although Milners manufacture steel office equipment of the highest grade as quoted, the statement conveys the impression that their manufacture of safes and security equipment is restricted. This is definitely not the case, as since the war all Milners safes have been re-designed on most up-to-date lines, and their range is most comprehensive



du-al



Eliminates the "Four o'clock Droop"



You will find, as have many leading industrial organisations that it will pay to investigate and install "Du-al" chairs and tables for your offices, factory and canteen.

"Du-al" furniture is comfortable in use, versatile in its variety of colours, materials and finishes, designed and styled to harmonise with almost any type of interior.

A qualified representative will be pleased to call and give free advice on all seating problems, write today for an appointment.

ALL TYPES OF STACKING CHAIRS AND FACTORY CHAIRS ARE FREE OF PURCHASE TAX.

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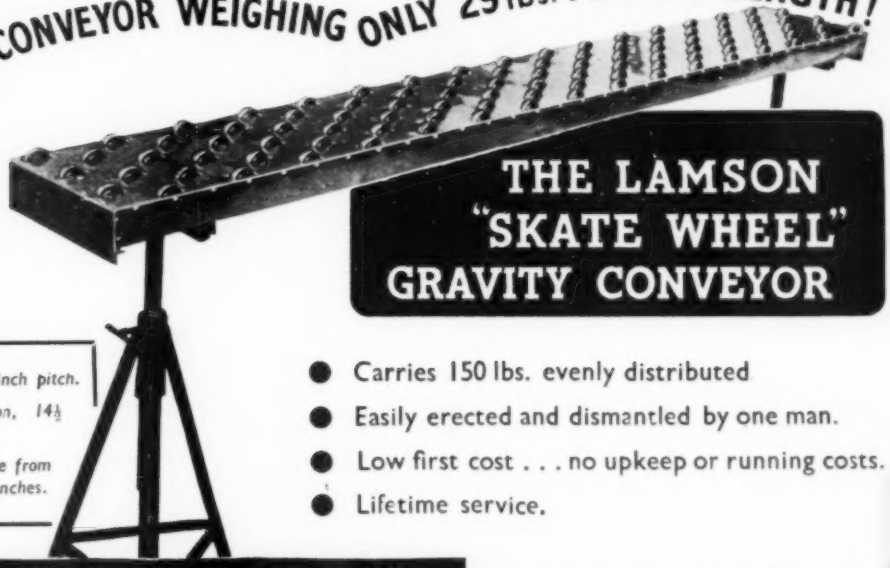
A GRAVITY CONVEYOR WEIGHING ONLY 29 lbs. PER 8 ft. LENGTH!



THE LAMSON "SKATE WHEEL" GRAVITY CONVEYOR

Wheels set at 3 inch pitch.
Width of section, 14½ inches.
Tripods adjustable from 28 inches to 46 inches.

- Carries 150 lbs. evenly distributed
- Easily erected and dismantled by one man.
- Low first cost . . . no upkeep or running costs.
- Lifetime service.

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100% NIGHT SECURITY

The BLICK WATCHMAN'S CLOCK gives the greatest security possible to your premises.

Satisfy yourself and your watchman by installing this modern watchman's control system embodying the following points:

- **Strong eight-day movement**
- **Unlimited stations**
- **Automatic Recording keys**
- **Multi-colour recordings**
- **Records can remain in the clock at week-ends**
- **Special record book to maximise effectiveness of control**
- **Foolproof and reliable**

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2 Blick House, 188 190 Gray's Inn Rd., London, W.C.1
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Also at Birmingham, Cardiff, Leeds, Manchester, Newcastle and Nottingham.

Planned Teamwork Saves Handling, Speeds Output

Searching for a means of boosting output, this knitwear firm finally chose the "Synchro" system. Based on planned teamwork and minimum handling of materials on the shop floor, the system has proved efficient, flexible, economical. While operatives' output and earnings have risen, management's production costs have fallen.

REORGANIZATION of production methods to provide greater flexibility and minimize handling of materials on the floor has enabled knitwear manufacturers to achieve higher outputs per operative and reduce their costs. Workers have readily accepted the new scheme, which has increased their earnings by as much as 20 per cent.

The history of these highly successful innovations goes back to 1945-46, when the Hosiery Trade Working Party visited the United

By A. G. THOMSON

States to study conditions there. The delegation included Mr. Percy Bussens, late chairman and managing director of Cooper & Roe Ltd., Nottingham and Ruddington, who formed the opinion that British factory organization, particularly in the Nottingham area, compared very favourably with that of the United States. He was, however, most impressed with the various labour-saving devices he saw and by the fact that the very latest equipment was being used for each operation. In these two respects British firms are still at a disadvantage, being unable to obtain delivery of the latest models of certain types of machines.

Since the Working Party's report, the entire hosiery trade has been acutely conscious of the need to become fully up-to-date in every detail of manufacture in order to secure the maximum share of world trade. Mr. Bussens died within a year of the report's publication, but Cooper & Roe Ltd. had already started reorganizing their entire structure of manufacture on a very large scale. Under the present managing director, Mr. A. Claude Dugard, the programme of reconstruction has been energetically carried out. Similar methods are being adopted by several other firms in Nottingham and Leicester, and in some factories an incentive system is being introduced. The industry has its own research association, which is actively associated with the efforts of manufacturers to implement the recommendations of the Working Party's report.

The house of Cooper and Roe was founded in 1888 as the result of a link-up between two Nottingham firms which had been in existence for a number of years previously. The present company was formed in 1917 and by 1920 had attained a leading position among Nottingham manufacturers. During the war more than ten million garments were produced for Government departments. The principal commercial manufactures are underwear in both wool and cotton, covering 400 different types of garments.

The company has two main factories, one at Ruddington, the other at Nottingham. To overcome one or two bottlenecks resulting from shortage of female labour, small factories have been started up in the past two years at Wirksworth, Derbyshire and Worksop, North Notts. All machinery for knitting the fabrics is at Ruddington, and garments are cut and made up at the Eagle Works, Nottingham, and at Ruddington.

First stage in the reconstruction scheme was to overhaul the production of fabrics at Ruddington. The latest type of conveyor system for supplying the knitting machines with raw material was introduced, and at the same time an air conditioning system was installed. The installation of conveyors involved a complete new layout of this section of the fac-

WHAT THE "SYNCHRO" SYSTEM DOES

1. **Saves production time by eliminating all unnecessary handling.**
2. **Splits each job into component sections.**
3. **Keeps operatives in small, self-contained production teams.**
4. **Gives each operative in each team one task only.**
5. **By use of tilted tables, enables quick transfer of materials from one operative to another.**
6. **Provides maximum convenience and comfort for operatives.**

The Old—

In this picture the machinists, seated at a long bench facing each other, are obviously cramped. After each operation the work has to be taken in and given out again to the next section of machines, perhaps in another part of the room.

tory and reorganization of the existing plant.

One effect of these changes was that the production per man increased very considerably, with a consequent increase in earnings. This improvement is ascribed to the elimination of all unnecessary labour and to the fact that operatives no longer have to wait for material or leave their jobs to go and find it, since everything is brought to them by conveyors. Today, the full benefits of the reorganization are being felt by the management and the operatives are also happier. Earnings have increased, with a corresponding improvement in production.

Having got this scheme successfully launched, the company turned their attention to the smaller ancillary operations, almost entirely performed by female labour. Here the principal difficulty was the very wide range of garments manufactured, which made it impracticable to instal a conveyor belt system similar to that used extensively in the clothing trade. After searching for a system which, through greater efficiency, could give higher production and yet not be too rigid, the company finally selected the "Synchro" system of the Singer Sewing Machine Co., Ltd., which is being increasingly used throughout the industry.

In the traditional system, female machinists engaged in cutting out and assembling garments sit together at long benches, each bench being equipped with machines for a particular operation. In the production of some types of garments work may have to be transferred from one bench to another as many as 18 times, so that much time and labour are expended in transporting material to and from the various operations in different parts of the room.

This production problem was solved by splitting up each job into its various component operations and reorganizing the machinists into small production teams. Each team specializes in one garment and each operative is confined as far as possible to one task only, such as sewing on vest sleeves, stitching on labels, etc. The benches —one for each girl—are arranged in suitable groups according to the type of garment required. The machines are equipped with individual drives, and plugs are provided in the floor, so that the benches can be plugged in or out as desired and be rapidly regrouped to suit the requirements of any particular job.

Continued on page 90

—and the New Method

Here the machinists are shown working as a team. Each girl has her own machine mounted on a separate unit. The units are linked by sloping tables, and the flow of work can be seen by following the arrows.

"Fine... Let's have 50 photo-copies by tomorrow!"

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Survey of Modern INDUSTRIAL EQUIPMENT

LIGHTING

Lighting for any Emergency

STAND-BY lighting equipment is essential where there is any likelihood of a power failure or where lighting, independent of the mains supply, is required. A battery-operated, adjustable, portable flood light set of improved design is now available for general or emergency industrial use.

The set, which gives a continuous bright light for nine hours, is contained in a welded steel box, measuring 14½ins. by 11¼ins. by 12¾ins. It is dependent electrically on an alkaline-type, nickel-cadmium battery which will stand unused almost indefinitely with complete absence of self-discharge.

An adjustable standard attached to the box may be swivelled in any direction and used up to a maximum height of 5ft. 5ins. This supports the bulb and reflector. When not in use, the standard apparatus can be packed away in the sturdy box, allowing easy transportation. If necessary, the set can be mounted on a light steel bogie with ball-bearing castors.

—(*Enquiry Ref. No. F.51/12.*)

Continuous light for nine hours is obtainable with this stand-by lighting unit.

GENERAL EQUIPMENT

Enamel for Alloys

OF interest to manufacturers concerned with aluminium and its alloys is the product *Tightcoat*, a vinyl based finish which has recently been developed. An elastic, resistant, waterproof, easily applied enamel, it requires a stoving time of only three to five minutes at 250 degrees F.

The product is completely unaffected by destructive agents such as petrol, benzol, soap, dilute alkali solutions, oils, fats or acid solutions, and withstands bending through 180 degrees. Non-poisonous and odour-free, the enamel, if properly applied, produces an excellent gloss. For application, roller coating, dipping or spraying methods can be used and no pretreatment is required. However, since these enamels are essentially stoving types, they must, for high results, be heat cured for the times specified.

As considerable care must be exercised in the choice of pigment used in coloured lacquers, not all shades which may be required are now available. So far, the following colours have been developed: white, pale cream, ivory, black, pastel blue, pale green, and dark

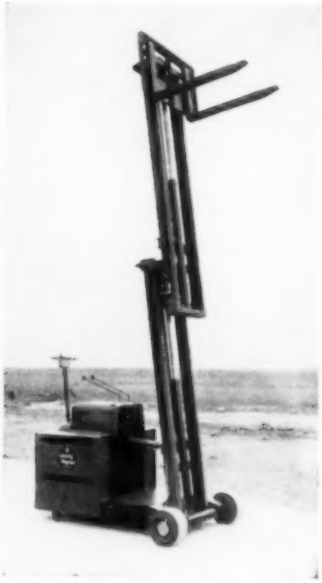
blue. Covering power possible with the first three shades lies between 50-60 square yards per gallon; with the others, between 60-70 square yards per gallon.

—(*Enquiry Ref. No. F.51/13.*)

MECHANICAL HANDLING

Versatile Fork Truck

FIRST of its type to be produced in this country, the Pedestrian Controlled Electric Fork Lift Truck is intended for all types of loading and unloading operations. It is most suitable in warehouses and workshops where congested



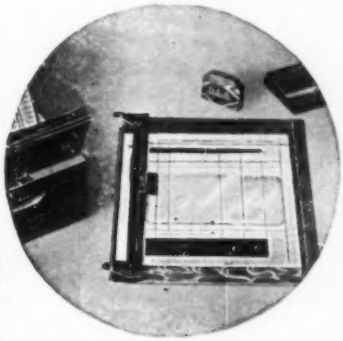
This pedestrian-controlled electric fork lift truck is available in 12 cwt., 15 cwt. and one ton capacities.

conditions or limited floor space necessitate narrow gangways.

Weighing less than one ton this truck may be carried in a lift, which allows loading to be carried out on the top floor of a multi-storey building.

Models are available with capacities of 12cwt., 15cwt. and one ton, and a novel method of construction allows a number of sub-assemblies to be arranged so that any of these capacities are easily obtainable. The truck can be provided with an electro-hydraulic operated lift of 5ft. 8in., or a telescopic lift of 10ft. 11in. Either lift

COUNTING THE COST



DEFINAC ACCOUNTING makes ONE operation of two, three or even more entries. It eliminates posting and posting errors, furnishes control sheets for any desired set of figures, and, as a by-product, yields statistical information of immediate value for managerial decision.

DEFINAC ACCOUNTING can be applied in every department of the counting house :: Sales and Purchase Ledgers :: Statements and Remittance Advices :: Receipts and Cheques :: Commission Accounts or Departmental Stock :: Private Ledgers and Pay Rolls :: Stores Control and Factory Costs :: or the more intricate problems of integrating financial and cost accounts—all will benefit by DEFINAC methods and by the advice of the DEFINAC expert. Strict specialisation has given us the opportunity of acquiring unrivalled experience of this type of accountancy and its "manifold" problems—experience at your service for the asking.

DEFINAC equipment quickly earns its cost and its keep. In its streamlined efficiency it avoids all unnecessary complications and remains unchallenged for posting speed.

DEFINAC VISIBLE makes every card instantly accessible. There is no fumbling or thumbing over unwanted cards. Every card is at the operator's finger tips, located or replaced at once, its absence from the tray is spotted at a glance, and mis-filing entirely prevented.

As a VERTICAL Visible Record, DEFINAC VISIBLE combines the compactness and high capacity of the usual type of posting tray with its own unique advantages. Two basic models are supplied and numerous arrangements are possible to adapt the system to every individual need. The DEFINAC range of trays and cabinets covers all requirements, from the very large to the smallest.

Definac VISITABS (reg. Trade Mark) offer an unprecedented wealth of signalling facilities. They stay with the card whether it is at rest in its tray, or pulled for posting or reference. They stay put and even pass through machine or typewriter. Any record, whether in trays, drawers, or posting binders can be adapted for DEFINAC VISIBLE, and current cards can be converted without re-writing.

DEFINAC VISIBLE is ideal as Machine Posting Equipment and is, of course, incorporated in all DEFINAC ACCOUNTING installations.

If you are concerned with organisation and methods in ANY branch of your concern, an early investigation of DEFINAC methods is indicated, and we shall be glad to consult with you without obligation.

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is available on any of the three capacity models.

The overall height of the mast is 83ins. and this does not increase until the forks have been elevated 5ft. 8ins. from the ground. Easily controlled by means of the twist grip handle, the truck has completely free manoeuvrability, since it has front wheel drive. A built-in charger permits the batteries to be charged from any convenient 15-amp. power point.

This pedestrian controlled truck has been primarily designed for operation on floors, and lifts with limited load capacity. It is equipped with suitable forks for handling and stacking unit loads on single and double faced pallets.

—(*Enquiry Ref. No. F.51/11.*)

INSTRUMENTS

Binocular Microscope

THE *Greenough* wide field binocular microscope, a stereoscopic instrument, is suitable for research laboratories, manufacturing inspection departments and engineering works.

Its notable points are wide field eye pieces, built-in illuminant, long range focusing (up to 6in.), three pairs of objectives, individual focusing (if required), and a large stereoscopic field. The last is par-

The Greenough wide field binocular microscope.

ticularly valuable when viewing objects at various stages of manufacture. The whole instrument is removable from the base.

Incorporating two inclination joints, the microscope is further adaptable. One joint allows the stage to incline with the microscope and the other permits the body and limb to be inclined, leaving the stage horizontal. This is useful when examining objects which are not precisely at right angles to the optical axis.

—(*Enquiry Ref. No. F.51/16*)

GENERAL

Rubberised Floor Paint

INDUSTRIAL psychologists have pointed out the beneficial effect in production of bright, cheerful surroundings. But the factory floor, perhaps the largest visual area meeting the worker's eye, is too often overlooked.

A new rubberised chemical resistant floor paint can easily be applied direct to new concrete floors without previous neutralizing treatment. All eight colours in which it is available (including white for marking traffic lines or machine areas) are resistant to mild acids, alkalis and other chemicals which might be used in various manufacturing processes.

Washable and easily polished, the paint can be brushed or sprayed on surfaces dry and free from dirt. Makers also recommend their product for use on wood or worn linoleum. One gallon covers 800 sq. feet of concrete, 900 sq. feet of linoleum, or 850 sq. feet of wooden flooring.

—(*Enquiry Ref. No. F.51/14.*)

Pressure Control

THE *Teddington* pressure control has been designed to meet the requirements of various commercial and industrial applications such as refrigeration. Consequently it is supplied with controls for low, mediu m and high pressure duty.

It has three adjustable ranges between the limits of 28mm. Hg Vac. and 250 p.s.i., which are housed outside the case of the instrument, the graduated differential adjustment and the calibrated scale being inside.

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The internal flexibility of the Amselock units is illustrated above. The drawers can be divided as required for any size of record, and the Units are so constructed to give solid cabinet strength and appearance.

Amselock have achieved a successful solution to the problem of providing maximum filing capacity in minimum space. Four standard drawers differing only in height provide filing capacity for any dimensions of card, file or paper, etc.

This internal flexibility can then be combined with the established Amselock system whereby individual cabinets are readily integrated into assemblies or desks, combining functional efficiency with maximum space economy.

Problems on filing continuously arise—AMSELOCK can make an important contribution to their solution. Consultation with us places you under no obligation.

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can be used for breaking or making a circuit on pressure charge. The terminals are well spaced and an earthing connector is provided.

—(*Enquiry Ref. No. F.51/10.*)

Sound Level Meter

THE makers of a new type sound level meter suggests that the initial step in the control and reduction of unwanted noise—so often neglected as an industrial hazard—is its accurate measurement. With this in mind, designers have produced a self-contained portable instrument giving a direct measurement of sound level over the full audible range.

Featuring direct reading, simple and rapid operation, and easy portability, this unit is suitable for research laboratories, and for industrial and psychological investigations.

The instrument consists of a non-directional crystal microphone, a high gain amplifier and an indicating meter. Batteries, fitted in a separate compartment, may be checked for condition on the indicating meter.

An output jack is provided for listening to the sound being measured, or for connecting to an A.F. Analyser to determine the component frequencies.

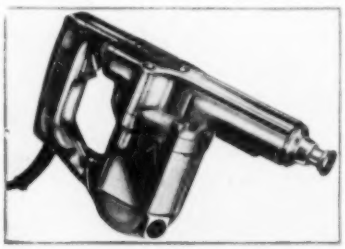
—(*Enquiry Ref. No. F.51/9.*)

PORTABLE POWER TOOLS

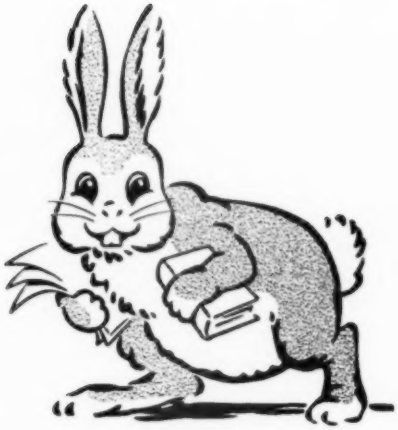
Lightweight Electric Hammer

AN electric hammer which weighs only seven lb. and will produce 1,600 blows per minute can have varied application in many industries. Complete with a wide range of accessories, it is applicable to almost all jobs which involve building or maintenance.

The *H.D.1* electric hammer fea-



The H.D.1 electric hammer weighs only 7 lb. and delivers 1,600 blows per minute.



YES, RABBITS!

Your staff are rather like rabbits — yes, rabbits! They vanish into the warren of your premises and aren't seen for hours. It's not their fault of course, their work takes them away from their desk, but they *do* have a way of vanishing just when you want them, don't they? Your clients probably have 'rabbit trouble' too: maybe they are too polite to say anything—perhaps they just 'try that other firm'. It's amazing just how much Goodwill is lost every minute a client is kept waiting while the man he wants is being 'hunted'. Pulling rabbits out of hats—or any part of your building—is a job for the 'Dicto-Call' Staff Location System. Interested? A 'phone call or postcard will bring you details of the way we can solve this big problem—out of Petty Cash.

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Here is a new system of visible records. It is perfect for the control of sales and purchases (among many other purposes). Each record has an overlapping visible edge—for quick sighting, posting and reference. One clerk can handle 500 to 12,000 records. The binder is streamlined and is only 2¼in. thick—the slimmest system ever made. Removal and replacement of any record is done by a simple flick of the trigger—no keys, no cumbersome mechanism. Each record is firmly held in position and cannot be mislaid. Each has a perfectly flat writing surface. Just write "Shannoleaf" on your letterheading and send it for further details of this new and latest method of control.

SPECIAL NOTE: An interesting new system has just been devised for the control of **COSTING RECORDS.** This would undoubtedly be of especial interest to your organisation. Just put "Shannoleaf for Costing Records" on your letterheading for full details by return.

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tures a dynamically balanced armature, extra heavy insulation for both armature and field coil winding, and a final flash test of 1,500 volts. All rotating parts are mounted on ball bearings housed in steel liners.

The kit, enclosed in a strongly built steel case, includes the following: rawldrills Nos 6 to 22 and a holder and tommy bar complete with ejector, for wall-plugging; ½ inch and ¾ inch stone mason's chisels, comb-holder with six combs, 2in. scaling chisel, chasing bit, including holder and ejector, all for light chasing cutting, combing, chipping and scaling; niphan plug and socket, for connecting extra cable.

The hammer is specially recommended for use in overhead positions, where a hand tool is ineffective.

—(*Enquiry Ref. No. F.51/15.*)

GAUGES AND TOOLS

Multi-use Clamps

TOGGLE clamps for clamping parts to be assembled, drilled, tapped, etc., are useful to a multitude of industries, so a new range recently introduced will be of interest to many manufacturers.

Useful in many industries are these new toggle clamps.

Made in two basic sizes with two main types in each size, the clamps are available with either a horizontal or vertical handle. These types can be varied to suit requirements by having flanged or vertical feet and a straight or twisted clamp bar.

A maximum open clearance coupled with a high and positive pressure (small size: 450 lb. max. Large size: 650 lb. max.) is an essential part of the design. The steel clamps have hardened and ground fulcrum pins and take only a few seconds to open and close.

Available in either their natural bright finish or in matt black, the clamps can be used for welding and brazing fixtures, light milling and grinding, etc., and are advantageous in practically any firm engaged in the manufacture of metal, wood and plastic articles.

—(*Enquiry Ref. No. F.51/17.*)

Checks the Pitch

CHECKING for possible pitch error in screw threads is often a "hit and miss" proposition when done with only the aid of a rule or scale. Yet with the introduction of a handy pitch checking instrument, measuring 3½in. by 2in., and designed to provide a quick, reliable check against long or short pitch errors, a great margin of possible measuring error has been overcome.

Innacurate thread pitch is made apparent by the amount of movement of a needle against a centre-zero scale. Plus readings indicate the pitch is long, whilst the minus readings indicate a short pitch.

—(*Enquiryc Ref. No. F.51/8.*)

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with a Wirek for dictation.

● There's not much that you cannot do with a Wirek magnetic recorder. We know that you are mainly concerned here with its usefulness as the perfect business dictating machine; but we think you may like to know what else it can do—outside office hours.

Take it away for the week-end, and connect it to your radio with a length of flex. It will record any broadcast programme. Used with your home cine, it will add commentary and music to your silent films. Play gramophone records on its turntable and it will record the music as it plays.

And, of course, when you take it back on Monday, on the 10.15, the same **60 minute** reel of wire, automatically erased, is ready for a business conference, a day's correspondence, or a two-way record of phone conversations. Words cost nothing with a Wirek. May we send you details of Model B.I.?

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EFFICIENT WORK FLOW AIDS PRODUCTION

Continued from page 52

office. There the final quantity received by the stores is entered in the progress record sheet.

This sheet is removed from the file and sent to the Stock Records Section, together with the stores receipt, in order that the quantity produced may be entered on the stock record sheets. The move card is now destroyed. The progress record sheet is filed in the Stock Records Office for three months for reference in the event of any query, after which time it is also destroyed. After the quantity has been entered on the stock record sheet, the stores receipt is sent to the Costing Department.

This system is proving very satisfactory in operation and has several notable advantages as compared with the system it replaced. Whereas three typists used to be typing out orders all day long all paper work is now printed, two girls doing the printing while another checks. Hand-written time tickets have been replaced by checkers tickets prepared on the printing machine.

With the new system any part can be found at any time, whatever section it may be in.

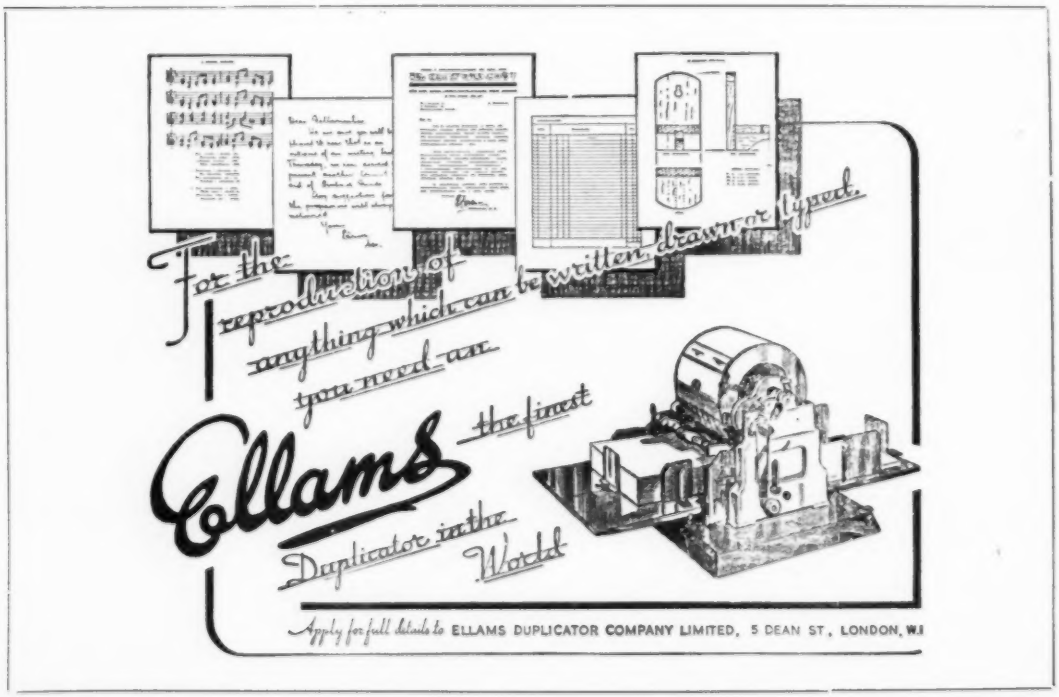
All costing information is available on the planning sheet and the cost can be closely tied to a batch of work. The cost centre code number on the operation layout constitutes a definite reference for the Costing Department, each code number representing a group of machines or a section of the machine shop.

The control organization comprises three separate sections, all of which come under the Production Controller and his assistant.

Raw Materials Control is responsible for the control of raw materials and contracted components. Under them is the printing machine section, which undertakes order printing, embossing of plates and changes to plates. Raw Materials Control also deals with stock records and stock control for the *Class* 100 cash registers; adding machine part lists, issue sheets and records; machine shop machine loading; raw material stores and component stores.

The *Order Section* is concerned with typing and making up of orders on the Dayton factory for components for the machines assembling from imported parts; progressing of these orders and maintaining records relating to import licences; purchase orders for bought-out items; assembly programmes; assembly orders; all the progress reports of all the various machines built at the factory.

Machine Shop Control controls the production orders placed on the machine shop; handles progress records, shop orders, tool holding records, and contracted work; is in charge of progress chasing, move men and checkers, movement of tools, and movement of raw materials and components.



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● **FINDEX** is the only available method of selecting group facts without disturbing the sequence of the cards—and this with hand operated equipment. Its application for staff, customer, accident, housing, education, medical, and all types of statistical record has been proved.

If your problem is one of these or you have any record where laborious searching is now necessary we shall be pleased to arrange a demonstration and discuss FINDEX with you.

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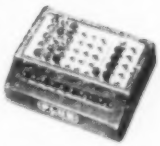

is the new name of the former London Computator Ltd. the Head Office of which continues at

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Similarly the PLUS Adder will be marketed by the newly named

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COSTING HELPS A PROCESS INDUSTRY

continued from page 65

The first variances to be evaluated are the "mix" and the price variances (if any). Both are deducted from the total variance, and the result is the volume variance. The latter may be further analysed into a controllable component and other factors, beyond the immediate control of the sales manager, such as lack of stocks, breakdown of lorries, etc.

A red figure in the controllable volume column may indicate slackness on the part of a traveller, failure of an advertising campaign or excessive prices. A red figure in the "mix" column shows that more products with a high cost of production were sold than cheap products. A red figure in the price column indicates that a loss was sustained due to the lowering of selling prices since the preparation of the budget.

On Schedule 2 (see illustration) it was assumed that the three varieties of bottled beer, *i.e.*, brown, light and pale, were to be sold in equal proportions (budget ratio) at an average price of 10/- a dozen. This ratio was applied in arriving at the budget figure of 125,000 dozen, *i.e.*, £62,500.

However, only 100,000 dozen were sold for £52,000, in the following proportions:

2/5 of 100,000 doz. at 10/- = £20,000
1/5 of 100,000 doz. at 8/- = £8,000
2/5 of 100,000 doz. at 12/- = £24,000

£52,000

If 100,000 dozen had been sold at budget ratio (1:1:1) at the average price of 10/-, only £50,000 would have been obtained. Therefore, there is a profit due to a favourable "mix" of £2,000.

In the same illustration it was assumed that 5,000 barrels of beer were produced as against anticipated sales of 5,618 barrels. Actually, 3,000 barrels were sold. Thus, the uncontrollable part of the volume variance, that part which was due to hypothetical lack of stocks, was (5,618—5,000) x £30 = £1,854. The remaining £76,686 is the responsibility of the sales manager.

Schedule 3, the standard profit statement, is an exact replica of schedule 2, except that sales values are replaced by standard profit values for each product and for each area. The profit "mix," price and volume variance are calculated in the same way.

The "mix" here indicates the extent to which variations in the budgeted profits have arisen due to changes in the anticipated proportion of sales of different products or lines. The budget ratio represents a judicious "mix" of costs, so that only a certain proportion of products with a high cost of production are included in the sales budget. Where this ratio is not maintained, *i.e.*, where there are excessive sales of high-cost lines, a loss is incurred.

The standard profits for the various products may be obtained from the combined account in the production ledger, the source which had previously supplied the sales figures for schedule 2. It should be noted that the standard profit is not a manufacturing but a trading profit; it is the result of deducting the cost of sales from the sales, and has therefore no connection with production. The sales quantities (not the quantities produced) are multiplied by the standard costs of the various products to arrive at their cost of sales. Thus, cost of sales includes materials, labour, and production overheads at standard, which have gone into the cost of units sold during the period. The entry which gives effect to the above transaction is: Dr. cost of sales, cr. finished stocks.

Schedule 4, **labour and overhead variance analysis,** has been dealt with in earlier issues.

Schedules 6 & 7 (illustrated) are self-explanatory.

Schedule 8 contains the same information (in totals) as schedule 9.

Schedule 9, the **marginal profit analysis,** shows the successive profit margins of each sales area, from the gross standard profit to the net marginal profit of each branch, depot or sales region. The following columns are used:

1. Gross standard profit.
2. Customers' distribution expenses—sub-total:
   (a) carriage, freight and insurance;
   (b) miscellaneous;
   (c) depot expenses;
   (d) motor transport.
3. Inter-depot distribution expenses—sub-total:
   (a) carriage, freight and insurance;
   (b) motor transport.
4. Total distribution cost.
5. Marginal profit at depot stage.
6. Selling expenses (direct allocations only).
7. Net marginal profit at depot stage.
8. Percentage of N.M. profit on depot sales.

The general administration overheads and part of the selling expenses which have no direct connection with the individual depot should not be included. The percentage in the last column reveals whether a particular sales depot is successful on an overall basis, and also provides a comparison of the working results of each depot.

ADMINISTRATION EXPENSES (SCHEDULE 6)

EXPENSE	PERIOD NO. ..... BUDGET £	ACTUAL £	VARIANCE £
Salaries and National Insurance			
Printing and Stationery			
Postages, Cables, Telegrams and Telephones			
General Office Expenses			
Bank and Professional Charges			
Travelling and Entertaining:			
Travelling and Entertaining			
Foreign Travelling			
Motor Transport Account			
Head Office General Overheads			

SELLING EXPENSES (SCHEDULE 7)

EXPENSE	PERIOD NO. ..... BUDGET £	ACTUAL £	VARIANCE £
Sales Department Salaries and National Insurance			
Traveller's Salaries and National Insurance			
Traveller's Commission			
Agents' Salaries and Commission			
Travelling and Entertainment Expenses:			
Travelling			
Entertaining			
Advertising			
Bad Debts			
Discounts, Allowances and Rebates on Sales			
Discounts on Prices			
Allowances...			
Rebates on Sales—Provision			
General Selling Expenses			

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PLANNED TEAMWORK

Continued from page 77

Units may be arranged at any angle to provide maximum convenience and comfort for the operatives. If one operation gets behind, an additional bench can be installed immediately to bring the work back into balance. Between each bench is placed a tilted table of suitable design. As each machinist completes her operation, she simply places the work on the table, without rising from her seat, and the next operative stretches out her hand and picks it up. Process follows process in rapid sequence, until at the end of the line the garment comes off complete in every detail. Thus all handling on the workshop floor has been eliminated.

Because the system is based on the synchronization of operations, the machinists have come to be known as the "Synchro" girls.

No scheme of reorganization is worth considering unless it shows a reduction in costs as well as increase in operatives' earnings. Both these objectives have been achieved. On a layout recently introduced at Nottingham, some of the female operatives are already earning 20 per cent. more than they ever made before, and costs of production have been reduced.

The changed system has involved a completely new angle of approach to the work throughout the factory. The operatives have become so co-operative that they are not only willing but anxious to be taught more than one job.

Nottingham is still very short of female labour. Apart from the hosiery industry there is a large demand on the available force from the lace trade and also from manufacturers of cigarettes and pharmaceuticals. Doubtless it is the knowledge that there will never be a surplus of female labour in the district that has made hosiery firms in Nottingham so conscious of the importance of providing attractive conditions of employment and achieving the highest possible standard of efficiency from every worker. It is still necessary for girls entering this trade to spend several months learning the job and acquiring skill in putting garments together. In cigarette-making and chemical factories, however, most of the jobs are repetitive and can be picked up in a few hours. Hosiery manufacturers are doing everything possible to overcome this disadvantage by splitting up the various processes and making them as simple as possible. At the same time, considerable pride is taken locally in the general appearance and turn-out of goods made in Nottingham, because the traditional skill is still handed down from mother to daughter. The "Synchro" system should enhance the attraction of the industry as an employer of female labour without reducing the traditional pride in the quality of the work produced.

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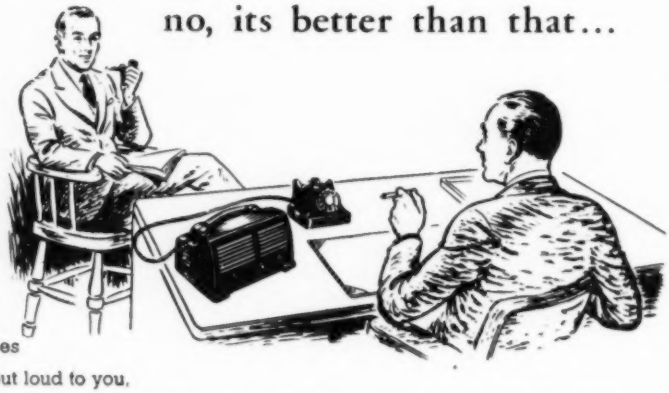

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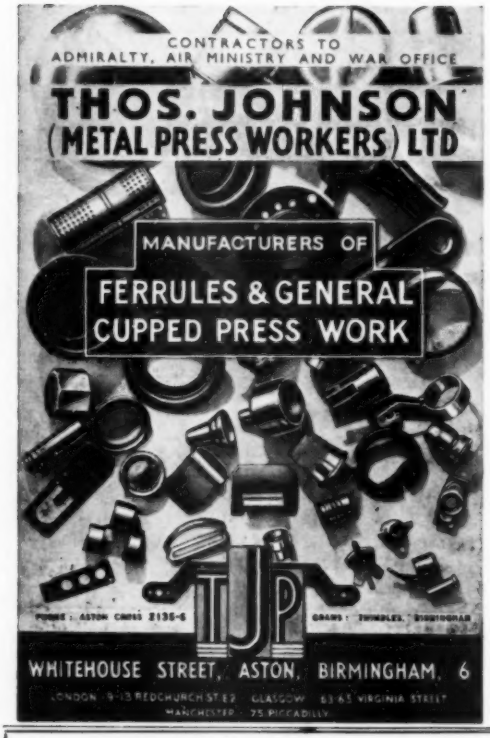

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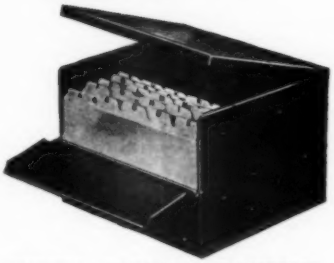

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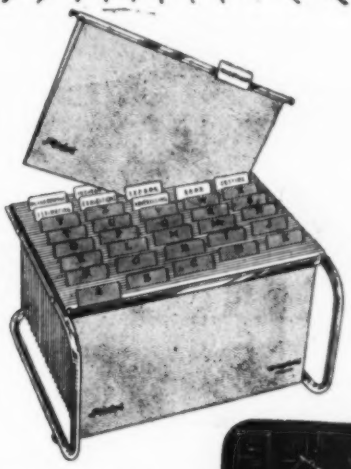

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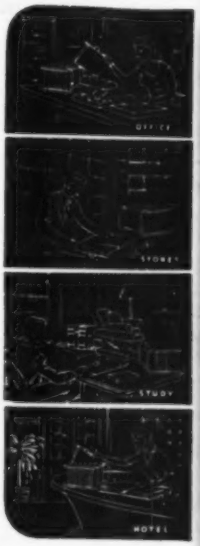

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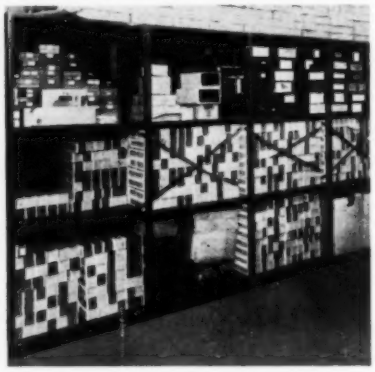

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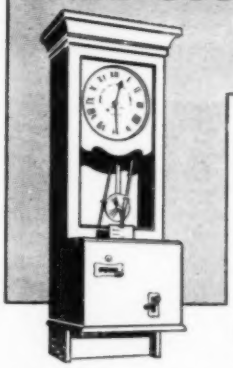

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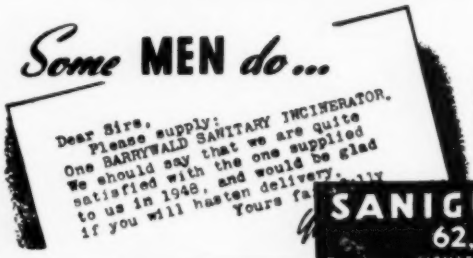
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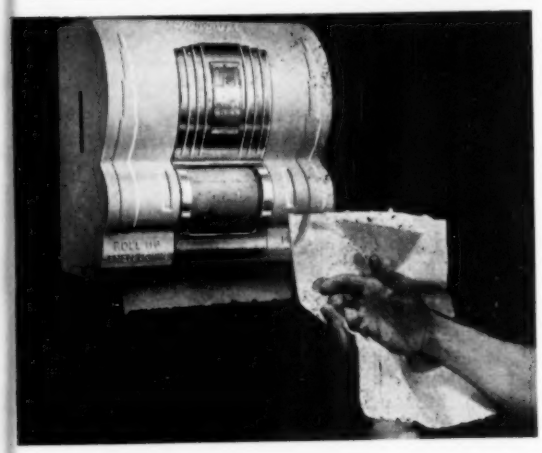

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Better Welfare Drew Them Like a Magnet to the Mills

By JULIAN JACOMB

Anxious to attract labour, a textile firm entered on a full-scale re-equipment, mechanization and welfare programme. In every detail the planning was slanted so as to improve conditions and encourage operatives to be proud of their place of work. The heavy expenditure more than justified itself. New labour was won—and held. Output soared.

WOOD Bros. (Glossop) Ltd. are a vertical integration of cotton, rayon staple and rayon textile concerns covering spinning, weaving, finishing, converting and making up. They control works in various textile centres, but the main mills are at Glossop, in Derbyshire, just across the Lancashire border. These mills were seriously affected by the war-time concentration scheme for the cotton industry, and more than half the premises were occupied by the Admiralty during the war.

When normal conditions returned, Wood's were thus faced with the task of building up a labour force almost from scratch in an industry where labour was already short.

So paramount was the labour problem that its solution became a first priority. Wood's management succeeded in cutting right across many of the hidebound traditions that have been one of the causes of the flight from the mills.

The most obvious cause of the reluctance of workers to return to the mills after the war was the relatively low earnings that could be gained as compared with those prevailing in other industries. Wood's tackled this by a large-scale re-equipment and mechanization programme; in 4½ years some £200,000 has been spent on new machinery in Glossop alone. In the immediate post-war years, textile machinery was hard to come by, but Wood's imported machinery from Germany, Switzerland, America and Japan to eke out the limited British supplies available.

When this new machinery was installed, careful time studies were made to ensure optimum work loads for the operatives, and a two-shift system with some part-time workers on 4-hour evening shifts was introduced to obtain maximum utilization of machinery. These measures increased productivity enormously, and, since all workers are on piece-rates, earnings went up correspondingly. One of Wood's youngsters recently staggered a youth club discussing "My Job" by saying, "The work at Wood's is hard, but it is worth it; I'm only 19, but I'm getting £6 a week."

High earnings by themselves, however, are insufficient to break down the mistrust of the older generation, with memories of bad times and poor working conditions prevalent in the 'thirties. For this reason, if for no other, many of Wood's re-equipment plans were slanted so as to improve working conditions in the mills.

The blowing room, where the raw cotton from the bales is cleaned and mixed prior to spinning, for instance, is traditionally an unhealthy spot, in which heavy manual work has to be done in an

The dance hall and a corner of the social club.

THE PROBLEM

1. Young workers' prejudice against the mills.
2. Labour scarce in any case.

THE OBJECTIVE

1. To increase output.
2. To enable operatives to earn more.
3. To attract fresh labour, retain labour already employed.

THE SOLUTION

1. Large sums spent on re-equipment and mechanization.
2. Time studies carried out to ensure optimum work loads.
3. Two shift system introduced, with some part-time workers on 4-hour evening shifts.
4. Air conditioning installed in what was previously the most unpopular section of the works.
5. Careful attention to welfare: (a) Works laundry—nominal charges; (b) Company shop—firm's products on sale at cost; (c) social club—first class amenities; (d) sports ground—gear provided by management; (e) Hostels for E.V.W.'s and flats for British workers.

THE RESULTS

1. Labour strength increased by 48% (weavers) and 47% (spinners).
2. Overall production raised 200%.

These two youngsters seem to be happy in their work.

atmosphere continuously thick with suspended dust. By spending £28,000 on improvements to their blowing-room, including the installation of air conditioning plant, Wood's have made it one of the pleasantest places in the mill to work in; the dust is dissipated as rapidly as it collects while the bulk of the manual work is done mechanically.

This expenditure has been justified economically, but its psychological effect in the recruitment of labour has been equally important. Many aspiring youngsters are deterred from taking a job in cotton by their parents, themselves former cotton workers, with memories of less happy conditions. When such youngsters come to Wood's, they are encouraged to bring their parents to see the mills, and one look at the new blowing room is usually enough to break down all but the toughest opposition.

Winning Young Workers

Investigation has shown—and Wood's experience confirms it—that one of the main reasons why young workers choose the jobs they do is the opinions expressed by their contemporaries, who are already working, about their own jobs and firms. The management, at any rate, is deeply concerned that the youngsters who work at Wood's should be proud to do so and will recommend the firm to their friends as a good employer. To this end, every effort is made to identify the workers with the firm and to provide welfare amenities

Perhaps the most spectacular of such amenities is the social club, housed in a converted house-and-shop belonging to the company and adjacent to the mills. The club's premises comprise a small dance hall equipped with a radiogram and a dais for a dance band, a basement with table tennis and similar facilities, rooms for bridge and other card games and for committee meetings, and a bar selling tea, coffee, soft drinks and snacks. The decor, which was done by two Polish artists, would not disgrace a fashionable West End night club.

Membership of the club is open to all workers employed by the company at a flat subscription of 5s. a year; the management is in the hands of a committee elected by the members.

Indeed, it is a cardinal principle of the whole of Wood's comprehensive welfare programme that while all capital expenditure will be met by the management, all running expenses must be met from receipts. There is no management subsidy of any welfare organization. A case in point is sports activities. The directors purchased a sports ground, clothes and equipment for three football teams, and handed these over to a works football club. The teams run their own fixtures and finance expenditure by organizing dances, whist drives and collections.

Welfare activities are not, however, confined to the youngsters An extremely popular institution, particularly among the married workers, is the works laundry. Women workers bring their family laundry in the morning, and collect it, clean and ironed, in the evening. A nominal charge is made which covers running expenses.

Another interesting feature is the company shop, where workers may buy any of the products of the associated companies at cost. This was born when the managing director took a book of patterns of finished cloth into one of the weaving sheds. The workers, some of them with 30 to 40 years' service, were incredulous that the standard grey cloth they had been weaving could be turned into such bright and gay fabrics. To-day they can see — and buy — the products of which the yarn they spin or the cloth they weave form the basis.

Hostel for E.V.W.s

The most intransigent factor in recruiting new labour, however, in Glossop as elsewhere, is the housing shortage. Labour to-day is, and must be, immobile. Here again Wood's have been able to do something. The company are fortunate in having buildings available. Their Long Mill, so-called because it is 100 yards long, was gutted of its machinery in the 1933 slump and has remained empty since. Three years ago, one storey of this mill was converted into a hostel for European Volunteer Workers (E.V.W.'s) Breeze-block partitions were run up to provide a series of bedrooms (three girls to a room), a communal sitting room and a canteen. The mill itself, built in the mid-19th century, is somewhat gloomy and forbidding, but inside the rooms are bright, with gay distemper and modern furniture and fabrics. The general impression is that of a good hotel rather than a barracks, as it so easily might have been. The hostel is under the supervision of a German woman, herself an E.V.W., assisted by a cook and a kitchen worker; much of the domestic work is done by the E.V.W. residents themselves.

The E.V.W.'s have proved good workers, and their employment has not led to the difficulties that might have been expected. Germans,

Continued on page 98

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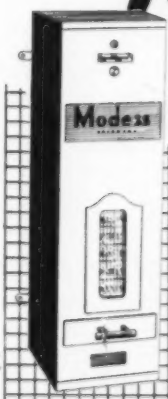

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Continued from page 98.

Poles, Latvians, Italians and other nationalities have got on well together and with their English co-workers, and the management is only sorry that this source of additional labour is, in the nature of things, drying up. The experiment of the E.V.W hostel has proved so satisfactory that the company are at present converting another disused mill into a block of 32 flats for their normal British wokers.

This comprehensive welfare programme has not offered a complete solution to Wood's labour problem, but has substantially ameliorated it. While the number of workers employed in the cotton industry as a whole has increased in the past two years by 4.4 per cent. for spinners and 10 per cent. for weavers, the corresponding figures for Wood's are 47 per cent. and 48 per cent. The production, however, through using modern machines and methods, has increased allover by more than 200 per cent.

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Under such protected conditions, personnel who have become lax about a dangerous machine, enclosed but not sufficiently guarded, will not be able to approach the unit while it is still in motion.

The delay bolt switch, an electromechanical safety device, consists of a bolt unit and bolt keeper. The last is intended for fitting to the moving portion of the guard structure and the bolt unit to the fixed part of the guard. When the bolt has been released, the motor concerned is automatically switched off and withdrawal of the bolt commences. This latter movement is under strict control of the delay mechanism and will not be completed until the set period (from four to 77 seconds) has elapsed.

The bolt, keeper and switch are so associated with each other that it is not possible to switch on the motor by moving the bolt unless it engages with the keeper. Thus, with the guard open, the machine will not start. When the bolt is "shot" into place, however, it engages with the keeper, allowing contact to be made.

It is compact, robust, easily fitted and may either be wired to remote "stop" connections of three phase contactor type starters, or to direct switching of motors up to ½-h.p. at certain voltages.

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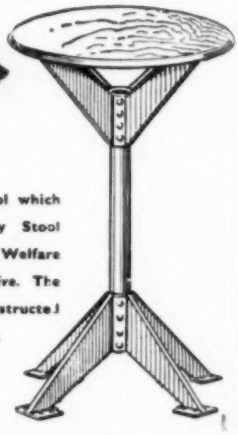

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Running a Cafeteria on Conveyors

By MALCOLM MOORE

IMAGINE a restaurant or works canteen in which the diners are conducted through the various stages of a meal on moving seats which reach the service point for each course at the appropriate time. There you have the conveyor cafeteria in a nutshell. A brilliant idea? More than that. The conveyor cafeteria is a practical proposition, worked out to the last detail by its British designers, world patented, ready for installation.

Smooth and efficient service in a restaurant, the designers told BUSINESS, is basically dependent on an effectively controlled flow between reception of food in the stock room to the point at which it is eaten. However excellently the preparation and cooking are planned, however effectively movement control operates through the kitchen and earlier stages, the smoothness of flow ends at the self-service counter.

At this point an uncontrollable factor is introduced — the customers, from the lady who decides at the *bain marie* that she would really rather have a salad (probably at the beginning of the service run), to mama with children who delays the whole queue while she searches for her purse at the bottom of her shopping basket.

Obviously, if all movements—of food and of the customer—were co-ordinated many troublesome factors would disappear. Complete co-ordination would:

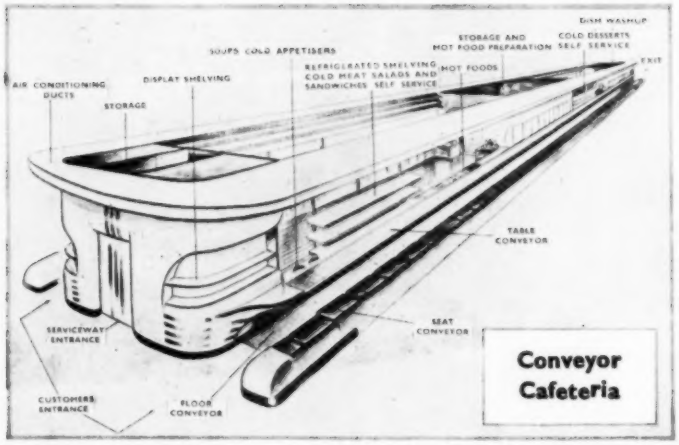
(a) provide comfortable seating;
(b) control accurately the time a customer occupied a seat;
(c) deliver food to the customer
(d) ensure that delivery did not permit loss of temperature;
(e) eliminate voluntary customer movement;
(f) remove dirty crockery and cutlery;
(g) wash it;
(h) return it to the point of service.

The conveyor cafeteria does all these things, and, what is more, the designers, who have gone into the matter with scrupulous care, say that it does them *on less floor space and with less staff* than any other known method.

For example, the floor space taken up by a complete conveyor unit compares in length with the service counter of a standard cafeteria. The width is greater if meals are served on both sides of the unit, but on the other hand all the space normally taken up by tables and chairs is saved. This means that the area required for the effective service of a given number of meals is automatically halved and that the freed space can be put to other use.

Fewer staff are required to operate a conveyor unit than the ordinary type of cafeteria because the demand is controlled and even. There are no tables, in the accepted sense, to be cleared. The service points are fixed and the supply of food and crockery to these points can be automatic. Similarly with the clearance points and the handling of used dishes. Thus all unnecessary running about is eliminated and the whole time of the service staff is employed, as it should be, in serving.

The conveyor cafeteria is ingenious, revolutionary. Its aim is twofold: to enable management to control the flow of movement in a restaurant or canteen, and enable diners in a hurry to enjoy the equivalent of a waitress served meal.



Conveyor Cafeteria

The conveyor cafeteria is a combination of three conveyors moving synchronously as seat, table and floor past various service points, which are located along the line of travel with careful regard to the duration of each course. On taking his seat on the conveyor, the customer is served with soup or *hors d'oeuvres* by a waitress standing behind the service tabling. By the time he is ready for meat and vegetables he has moved to the point at which these are being kept hot and awaiting his choice. So on to the sweet and coffee. The conveyors return below the floor level, where they are automatically cleaned and dried.

Mechanical Dish Washer

Behind the customers' tabling is a fixed service way on which *bains maries*, refrigerated space, hot closets, pastry sections, etc, are arranged at strategic points. Immediately crockery and cutlery are finished with, they are placed on a supplementary conveyor and ten minutes later, having passed through a mechanical wash before the food residue can coagulate, are back clean at the service point at which they were originally placed in front of the diner. Thus the number of pieces required for continuous service is a fraction of the number necessary in the average cafeteria. In addition, since there is minimum handling or manual control, the number of staff required is considerably reduced.

The length of a unit can be adapted to suit the space available. For example, since each seat is 24in. wide, a unit of 120 seats measures 128ft. overall, including end sections. The width of the unit is 6ft. 6ins., to which must be added the width of service way between the two tables. Normal width for such a service is 9ft., so that the overall width of the unit and service way combined is 15ft. 6in.

The rate of travel of each seat is controlled at five to seven feet per minute for a three-course meal lasting 18 minutes. This speed, incidentally, is so slight as to be imperceptible unless the diner chooses to fix his gaze on a stationery object.

On the above basis one arrives at a capacity of handling 400 meals per hour in a space of 1,920 sq. ft. If sufficient space is allowed at each end for free access, this means a total effective area of 2,400 sq. ft. In other words, 6 sq. ft. per hour per meal of service and table seating and dish-washing space are required.

The speed at w .e conveyors move ight as to be imperce unless the diner fixe gaze on a stat-ry object.

A comparative figure can easily be arrived at for any cafeteria by taking the total area used for service counters and tables, plus the dish-washing area, and dividing it by the number of meals served per hour at peak capacity. The figure will be in excess of 10 sq. ft. per meal per hour—less than half the capacity of the conveyor cafeteria.

The designers do not suggest that the conveyor cafeteria will answer a universal appeal. They appreciate that many people are not usually obliged to have a quick meal.

On the other hand, they claim, a far greater number are less fortunately placed and will welcome a system which enables them to enjoy a complete meal in comfortable surroundings and eliminates the two great bugbears of self-service — tables littered with dirty crockery, and food which is often half-cold when eaten.

	Normal Layout in London Cafeterias			120 ft. long Conveyor Cafeteria.
Area occupied by service, dishwash and seating in sq. ft.	3,120	4,500	5,010	2,400
Labour, service and dishwash ...	19	24	27	15
Nos. of meals per hour	300	480	550	400
Area per meal per hour in sq. ft. ...	10.4	9.4	8.6	6.0

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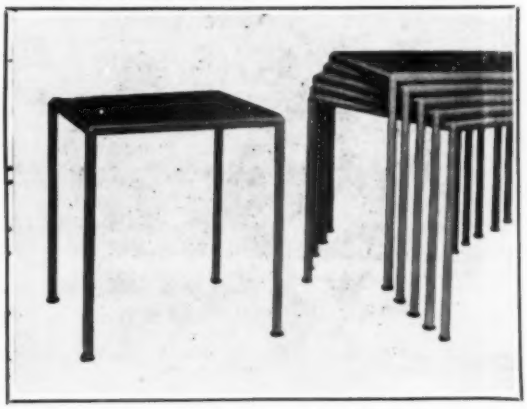

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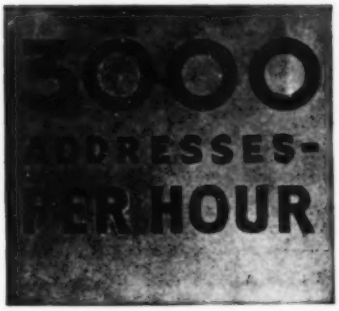

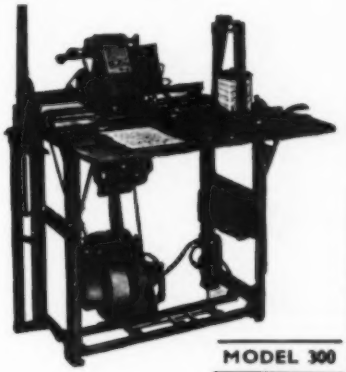

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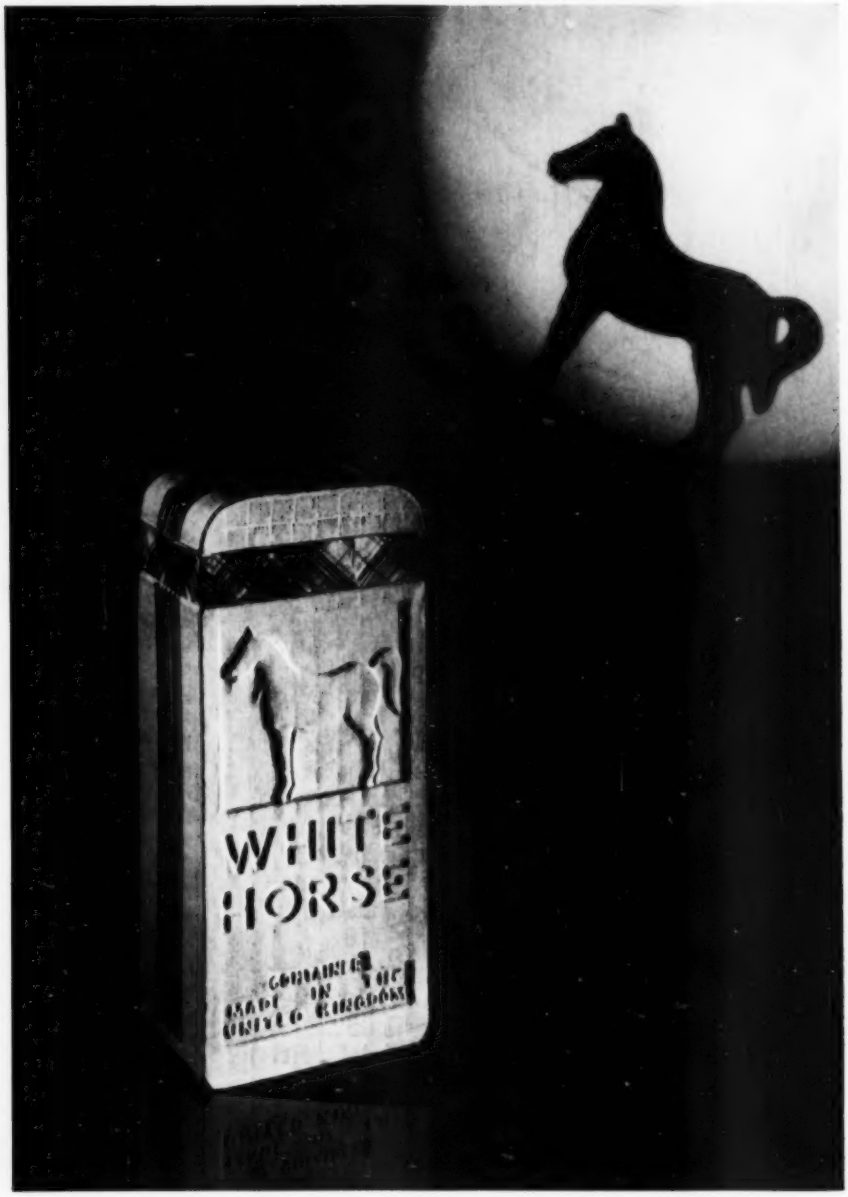

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